July 2, 2002

SOUTHEAST GALENA ROADS ANALYSIS

Malheur National Forest

July, 2002

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Southeast Galena Roads Analysis

Background and Purpose

Land management strategies and the road maintenance budget have changed significantly during the past decade. On March 3, 2000, the Forest Service published its proposed transportation system policy revisions in the Federal Register (65 FR 43). Decisions to decommission, reconstruct, construct, and maintain roads are to be informed by a science based roads analysis. Miscellaneous Report FS-643, **Roads Analysis: Informing Decisions About Managing the National Forest Transportation System,** was published in August of 1999, and describes in detail the roads analysis process. **FSM 7700 (12/14/2001), Chapter 7710, Transportation Atlas, Records, and Analysis, Section 77**12, provides direction and policy related to transportation analysis and the roads analysis process.

Road systems are expensive, valuable, and potentially damaging, and an important stewardship element of Forest Land Management. The intent of a Roads Analysis is to look at the current road system, and determine where changes are needed to reduce impacts, reduce maintenance costs, and better fit today's access needs. Roads Analyses should identify roads with little utility and high resource impacts, and roads with high utility and high resource impacts, and draw distinctions between benefits and effects. The results of a Roads Analysis are intended to guide future actions, not prevent them.

The Roads Analysis process should focus on identifying the "minimum road system" needed for safe and efficient access for administration, utilization, and protection of National Forest System Lands. It should produce a strategy that can be used to change the existing road system to fit current access needs as funding opportunities become available.

A roads analysis is not intended to produce recommendations for a "final" road system. It is intended to assess the existing road system and reasonably forseeable needs for road access, and to make recommendations for changes based on that assessment. Just as with a Watershed Assessment, as new information becomes available or needs and situations change in the future, the road system will need to be assessed again to determine if other changes in the road system are needed.

The purpose of a roads analysis is to ensure the Forest Transportation System:

- Provides safe access and meets the needs of communities and Forest users;
- Facilitates the implementation of the ***Land and Resource Management Plan*** (LRMP);
- Allows for economical and efficient management within projected budget levels;
- Meets current and future resource management objectives;
- Minimizes road related ecological impacts.

Assumptions

This roads analysis was done based on the following assumptions:

- The need for a basic transportation system will continue to exist;
- Available maintenance dollars are likely to remain static or increase only marginally in the foreseeable future;
- Roads can adversely affect water quality and riparian habitat;
- Poor road conditions can present a hazard to users, and are a liability to the Forest;
- Roads will continue to be used for recreation, administration, fire protection, permit and contract access, special uses, mining, and other traditional uses.

Information Needs for the Analysis

The road analysis policy and process were published after a planning effort named the ***Southeast Galena Restoration Environmental Analysis*** was already in progress. Because this roads analysis effort took place concurrently with that planning effort, most of the information needs were the same for both analyses. This included a need for current condition surveys of all of the existing roads in the area. It also included analysis of the inter-relationships between the roads and other resources in the area, including soils, hydrology, water quality, fisheries and wildlife.

Limitations of this Roads Analysis

--General

Most of the existing road mileages and locations used for this analysis and included in this document were generated through queries of the Forest Geographical Information Systems (GIS) database. The road mileages and locations reflect what is recorded in the GIS database, which will vary slightly from what is actually out on the ground. The recommended new construct roads and road relocation segments displayed on the maps and their lengths are also approximate, as many of the locations have not been established on the ground.

While the information in the database is not 100 percent accurate, the road mileages overall are not expected to vary significantly from the numbers used, and the GIS database represents the best information the team had available to use for the analysis.

--Closed Roads

While this analysis makes recommendations for specific roads to either remain closed or be placed in a closed status, it does not recommend specific closure types or methods for each road. Specific closure types and methods need to be designed on a road-by-road basis to ensure the closure is effective, and could vary depending on the intent of the closure (short-term or long-term).

--Mining Access

There are many historic mining sites located within the analysis area, which produced gold, silver, and other locatable minerals. During recent decades the level of mining activity in the area has been relatively low. At the time this analysis was done, there were about 10 active mining claims located inside the analysis area, and the amount of actual mining activity taking place on the ground was very minimal. The recommendations from this analysis include maintaining reasonable access to the active claims, which in some cases may mean deferring decommissioning activities on a few road segments.

The amount of speculation, interest, and actual level of mining activity is dramatically influenced by the market values of locatable minerals, which are currently relatively low. The number of mining claims and related activities could increase very rapidly from the current level if market prices became significantly higher, and if this did happen, the need to provide reasonable access for mining operations could also increase proportionately. As planning and decisions to implement road decommissioning are prepared, a thorough review of the most recent list of mining claims needs to be done to identify any potential conflicts with providing reasonable access to claims.

--Road 2610759 Road

This road is a tie-through between the Dixie Creek drainage and the Dixie Mountain Lookout Road, so only part of the road is located within the Southeast Galena analysis area. It is the only classified road located within the Dixie Butte Wildlife Emphasis Area, and is a popular travel route during hunting season. Substantial segments of this road have never been constructed to any official standard; some portions were probably originally constructed for mining access. The current condition of most of this road is relatively poor. The drainage is inadequate, and some segments are severely out-sloped and hazardous to drive. The existing maintenance level of the road from the beginning at its junction with road 2610 to milepost 4.4 is a **2**, with an objective maintenance level of **1**. From milepost 4.4 to the end of the road at its junction with road 2050, the existing maintenance level is listed as **1**, with an objective maintenance level of **1**. Parts of this road have been closed in the past, but the closures have not been effective, and have frequently been breached.

This analysis does not specifically recommend changes to the Road Management Objectives for this road, but has identified a need to do some further evaluation to determine what the future status of this road should be. If the road is to be left open, it should be reconstructed to provide for user safety. If it is closed or decommissioned, it needs to be done in an effective manner.

Previous Analysis and Decisions

Several Access and Travel Management (ATM) plans have been implemented within the analysis area in the past decade. In the area west of Forest road 4559 on the north side of the Middle Fork of the John Day River, the ***Lower Middle Fork ATM Plan*** was implemented in 1994; some changes to this plan were implemented in this same area through the ***Summit Restoration Plan*** in 1998. For the area east of Forest road 4559 and on the north side of the Middle Fork John Day River, the ***Upper Middle Fork ATM Plan*** was implemented in 1995. And for the portion of the analysis area that is south of the Middle Fork John Day River, the ***Northside Middle Fork ATM Plan*** was implemented in 1997.

The cumulative result of implementing those ATM plans was that a significant number of roads have been closed and decommissioned, which resulted in a decrease in both total road miles and open road density in the area. Based on monitoring and this analysis, not all of the road closures that were implemented with previous decisions have been effective, and not all of the roads that were decommissioned were left in a condition that meets current standards (for decommissioning). This analysis also concluded that there are three roads that were previously decommissioned inside the analysis area that are still needed for long-term access and management of the area.

The Roads Analysis Team

The Southeast Galena roads analysis was accomplished by following team members, with support from others, including GIS personnel:

Mark Lysne	Civil Engineer/Geologist	Engineering/Writer Editor
Kim Conlee	Civil Engineering Technician	Engineering
Dan Hagen	Forestry Technician	Access & Travel Management
Mary Lou Welby	Hydrologist	Hydrology/Soils/Aquatics
Perry Edwards	Fisheries Biologist	Fisheries/Aquatics
Ken Schuetz	Wildlife Biologist	Terrestrial Biology
Jean Wood	Botanist	Botany/Ecology/Noxious Weeds
Allan Tschida	Realty Specialist	Lands, Non-Recreation Special Uses
Shannon Winegar	Forestry Technician	Recreation, Recreation Special Uses
Elaine Kohrman	Economist	Economics and Social Uses
Bryan Lynch	Silviculturalist/Fire Planning	Fire and Fuels
Eric Wunz	Silviculturalist	Silviculture
James Sullens	Forestry Technician	Logging Systems
Don Rotell	Archeologist	History, Archeology
Connie Jenkins	GIS Assistant	GIS Reports & Maps
Dee McConnell	GIS Assistant	GIS Reports & Maps
Karen Scharpf	GIS Coordinator	GIS Reports & Maps

Location and Scope

The ***Galena Watershed Analysis*** was completed in June of 1999 and covered the entire watershed, which is only a portion of the Forest Lands in the Middle Fork of the John Day River Sub-Basin. The Galena Watershed Analysis made a number of recommendations related to roads and road management, one of which was to develop an updated Access and Travel Management Plan (ATM) for Galena Watershed. This roads analysis covers the area within seven of the subwatersheds of the Galena watershed (listed in Table 1), which make up the southeast half of the watershed. The analysis area is located about 25 air miles northeast of John

Day, Oregon. The transportation system in the remainder of the watershed (the northwest half) will be addressed with another road analysis effort in the future. Both documents are intended to become addendums to the Galena Watershed Analysis.

Table 1: Subwatersheds and Land Ownership within the Southeast Galena Roads Analysis area:

SWS NAME	SWS NUMBER	SWS ACRES	MALHEUR NF ACRES	UMATILLA OR WALLOWA-WHITMAN ACRES	PRIVATE ACRES
Davis/Placer Gulch	30201	7,462	6,966	0	496
Vinegar	30203	7,585	7,118	411	56
Vincent	30205	3,769	3,758	0	11
L.Boulder/Deerhorn	30207	10,983	10,614	0	369
Tincup/L.Butte	30209	7,430	7,173	0	257
Butte	30211	4,861	4,854	0	7
Granite Boulder	30213	7,383	6,631	713	39
TOTAL		**49,473**	**47,114**	**1,124**	**1,235**

NOTE: SWS = Subwatershed L. = Little

Table 2: Forest Acres by Subwatershed and management area in the Southeast Galena Roads Analysis Area:

SWS NAME	SWS NFS ACRES	MA 1 1/	MA 4A	MA 7	MA 13	MA 14 2/	MA 21	RHCA 3/
Davis/Placer Gulch	6,966	5,154	0	0	379	97	304	1,031
Vinegar	7,118	4,466	0	786	568	22	0	1,277
Vincent	3,758	3,181	0	0	1	8	0	568
L.Boulder/Deerhorn	10,614	6,461	1,027	340	275	558	341	1,576
Tincup/L.Butte	7,173	2,823	1,949	0	400	508	358	1,125
Butte	4,854	1,267	993	0	0	25	1,751	804
Granite Boulder	6,631	1,805	901	3,011	28	0	0	886
TOTAL	**49,473**	**25,157**	**4,870**	**4,137**	**1,651**	**1,218**	**2,754**	**7,267**

1/ MA 2 and Middleground of MA 14 2/ Foreground only 3/ MA 3B (anadromous fish) acres are accounted for in RHCA acres

Objectives

The primary objectives of this roads analysis are to:

Identify the need for changes by comparing the current road system to the desired condition;

Balance the need for access with the need to minimize risks by examining ecological, social and economic issues related to roads;

Furnish maps, tables, and narratives that display and describe transportation management recommendations and opportunities that will address future access needs, probable road maintenance funding, and environmental concerns.

Historic Use – Roaded Areas

The development of access routes and historic use of the area is well documented in the ***Galena Watershed Analysis.*** Railroad logging played a prominent role in the history of the watershed. Railroad logging began in the analysis area when the Oregon Lumber Company (OLC) built railroad spurs off from the Sumpter Valley railroad system into the area starting in 1905. The OLC constructed a narrow gauge railway from the town of Bates down the Middle Fork of the John Day River toward the mining towns of Susanville and Galena in 1916. The OLC spurs in the project area were used between 1917 and 1947.

Railroad logging site types in the project area include: linear segments of railroad grade in various conditions, trestles and other earthwork engineering features, and remnant logging camp/temporary occupation sites. Spurs of this system extend from the mainline up major tributaries of the Middle Fork such as Vinegar Creek, Deerhorn and Butte Creek. Remnant railroad logging camps are located in the Vinegar Creek and Deerhorn Creek drainages.

The road system has also evolved over time. The Forest Service was building roads for fire access starting in about 1925, and much of the area was well roaded by 1950. But the majority of the Forest roads in the area were constructed between 1960 and 1995. The area can be accessed from many directions but the primary access is east from John Day on U.S. Highway 26 to the junction with State Highway 7, north on State Highway 7 to the junction with County Road 20, then west on County Road 20 along the Middle Fork John Day River. The main Forest Service roads that access the analysis area include all or portions of roads 2010, 2050, 2055, 2610, 2612, 2614, 4550, 4557, and 4559.

Historic Use – Roadless Areas

Portions of two Malheur ***Land and Resource Management Plan*** inventoried Roadless areas are within the analysis area: Greenhorn—about 6,519 acres on the north side of the analysis area and Dixie-Butte —about 7,865 acres on the south side of the analysis area.

In the Dixie Butte and Greenhorn Roadless Areas, the emphasis is to have these areas function as biological strongholds for populations of threatened and endangered species as well as provide large, relatively undisturbed areas for wildlife dependent on this character. Benefiting uses include opportunities for dispersed outdoor recreation that emphasizes little to no evidence of management activities that might detract from a natural setting.

Dixie Butte Roadless Area

The Dixie Butte roadless area is located in the northern portion of the Malheur National Forest and southeast portion of the project area. The roadless area includes almost all of the land that comprises the Dixie Butte Wildlife Emphasis Area, as well as significant areas located outside of the boundaries of the Wildlife Emphasis Area. The roadless area consists of Dixie Butte (elevation 7,592 feet) and portions of the surrounding drainages tributary to the Middle Fork of the John Day River and the main stem John Day River. Dixie Butte is a prominent landmark that rises above the surrounding forested areas. Side slopes are steep at higher elevations, and bench-like at lower elevations.

Vegetation on the summit of Dixie Butte is primarily open sagebrush and ground plants. Tree species in the areas near the tree line include sub-alpine fir, engelmann spruce, and white bark pine. At midslope elevations, tree species include grand fir, western white pine, douglas-fir, western larch, lodgepole pine, and engelmann spruce. In the lower elevations, tree species include ponderosa pine, douglas-fir, grand fir, and western larch. Generally, the upper elevations have not been managed or logged. As a result of fire suppression vegetation changes have occurred over time. The results include unnaturally heavy tree stocking levels and accumulations of fuels and slash. Even with this alteration, the higher elevation forests are similar to historic conditions for forests with intense, low frequency fire regimes.

The same type of railroad logging described under **Historic Use – Roaded Areas**, took place in the lower elevations of the Dixie Butte Roadless Area. The lower forests are heavily altered by past railroad logging, truck logging, and fire exclusion. There are few large trees and re-growth is very dense (high stocking), and tree composition is different than historic conditions expected for forests with frequent, low intensity fire regimes.

Current recreational uses include hiking, cross-country skiing, snowmobile riding, hunting, prospecting, camping, mushroom harvest, and viewing scenery. The area provides summer habitat for mule deer and Rocky mountain elk, habitat for cougar, bear, bobcat, and other small game mammals. Butte, Little Butte, Deerhorn, and Davis Creek flow north into the Middle Fork of the John Day River and provide resident trout fishing as well as spawning and rearing habitat for steelhead. Some of the streams provide rearing habitat for Chinook salmon.

There is one primitive road, Forest Road 2610759, which bisects the Dixie Butte Wildlife Emphasis Area portion of the roadless area. This road is part of a loop access route to the Dixie Summit area, and it is a popular travel route during hunting season.

Greenhorn Mountain Roadless Area

This area is located along the northern boundary of the Malheur National Forest on both the Malheur and Umatilla National Forests and in both Grant and Baker County. The Greenhorn Roadless Area extends along the divide between the Middle and North Forks of the John Day River. Much of the roadless area boundary is in common with the boundary of the Vinegar Hill-

Indian Rock Scenic Area, but the roadless area includes lands that are located outside of the Scenic Area. Almost all of the Scenic Area is located inside of the roadless area boundary.

About 87 % of the total area is forested, and about 40% of the total area is within the analysis area. Most of the area on and near ridge tops is undulating terrain consisting of open alpine meadows. Below these ridge tops, however are sharp breaks in the terrain, particularly to the north, with rock cliffs dropping away to steep drainages below. Vegetation on ridge tops and side slopes include meadows of alpine sagebrush, elk sedge, and alpine fescue, as well as stands of white bark pine and sub alpine fir, and spruce bogs. Upland flats and north-facing side slopes support white fir, lodgepole pine, larch and douglas-fir, with ground cover of pine grass, elk sedge and huckleberry. Most of the area within the analysis area is south facing and has a drier environment. Lower elevations include moist forests with grand-fir, douglas-fir, and western larch, and drier forests with predominantly ponderosa pine and western larch.

Both the vegetation and drainages were altered prior to establishment of the roadless boundary, as a result of past logging practices, grazing, mining, and fire exclusion. Forest stands in some areas, and particularly along both sides of the ridge dividing Little Boulder Creek and Windlass Creek, are in poor condition. In these areas, heavy fuel accumulations and a high fire risk have developed as a result of insect damage and disease.

Current uses include hiking, cross-country skiing, riding of snowmobiles, hunting, prospecting, camping, mushroom harvest and viewing scenery. The area provides summer habitat for mule deer and Rocky mountain elk along with habitat for cougar, bear, bobcat, lynx, and other small game mammals. The unique alpine habitat provides an opportunity to view uncommon bird life such as the pine grosbeak and the northern three-toed woodpecker. Many of the streams provide trout fishing opportunities and contain spawning and rearing habitat for steelhead.

Areas Contiguous to Roadless Areas With Potential Roadless Values

The team conducted a cursory analysis to determine whether the analysis area includes roadless areas or areas with minimal classified roads that are located outside of the LRMP designated roadless areas (i.e. Dixie Butte and Greenhorn Mountain "Appendix C LRMP" Roadless Areas).

Using the criteria and process specified in the **National Forest System Land Resource Management Planning; Final Rule** (cf. 36 CFR part 294 special areas; Roadless Area Conservation; Final Rule 294.11; January 2001), the team identified three areas within the analysis area that are contiguous to currently designated roadless areas, which currently have very few or no classified roads, and are of a size and configuration that might warrant future evaluation as potential candidate areas (for preserving any inherent characteristics associated with roadless conditions). These areas border existing inventoried roadless areas, but do not overlap with them. This analysis does not include recommendations to develop any new motorized access within the three areas identified. Management options for these areas will be preserved until the ***Land and Resource Management Plan*** revision for the Forest is completed.

Existing Road System Conditions (including benefits, problems, and risks):

Most of the current roads were constructed to support timber-related land management objectives. Each mile of road is dependent on maintenance to keep the road safe for users, to keep environmental risks at an acceptable level, and to protect the road investments. The roads were constructed with the expectation that timber-based land allocations would generate funding needed for road maintenance on a long-term basis.

The **Land and Resource Management Plan** (LRMP) for the Malheur National Forest (1990) displayed projected timber harvest of over 200 MMBF annually. Amendments to the plan, listing of Threatened and Endangered (T&E) species, and other recent developments have drastically limited the amount of annual timber harvest from the Forest. As a result, the opportunities to reconstruct or maintain roads that were traditionally associated with timber harvest activities have declined substantially during the past decade. The Cooperative Work Forest Service (CWFS) trust funds that are collected through deposits generated from timber haul have also declined substantially within the same timeframe.

A cursory comparison between the total amounts of appropriated funding the Forest receives to perform road maintenance today compared to the same funding a decade ago reveals that the total dollar amount has not changed significantly. The Forest has recently acquired the added road maintenance responsibilities for the Snow Mountain District, which added over 2000 miles of roads to the maintenance program. So while the cost per mile to accomplish road maintenance has risen steadily through inflation over the past decade, the funding has not. The net result is that the Forest has less funding available to maintain a significantly larger number of road miles, and it no longer receives contributions through timber sale activities that are comparable to the past levels (to help fund road maintenance activities).

Existing open road densities in the SE Galena planning area generally meet or exceed Forest Plan standards, which the LMRP clearly intended to be monitored on a ***watershed*** basis (Chapter IV, page 22, Roads). If monitoring were done on a **subwatershed** basis, the Tincup/Little Butte and Granite Boulder subwatersheds would not meet big game winter range (MA-4a) road density goals. In winter range, the standard for open road density is to not exceed 2.2 miles of open road per square mile. Currently, the Tincup/Little Butte and Granite Boulder Subwatersheds have open road densities of 3.47 and 6.74 miles per square mile respectively.

Existing Open and Closed Road Miles and Road Densities

The table that follows displays the current road densities and total road miles by subwatershed in the analysis area:

Table 3 - Existing Road Miles and Road Densities by Subwatershed

SUBWATERSHED	Total miles	Total road density (miles of road per square mile)	Open miles	Closed miles	Open road density (miles of road per square mile)
Davis/Placer Gulch	45.3	3.9	22.9	22.4	2.0
Vinegar	42.8	3.6	22.1	20.7	1.9
Vincent	30.2	5.1	9.7	20.5	1.6
Little Boulder/Deer horn	41.7	2.4	19.8	21.9	1.2
Tin Cup/Little Butte	37.1	3.2	25.5	11.6	2.2
Butte	28.2	3.7	7.8	20.4	1.0
Granite Boulder	40.1	3.5	25.6	14.5	2.2
GRAND TOTAL	**265.4**	**3.4**	**133.4**	**132.0**	**1.7**

The numbers and mileages listed are based on a 6/26/2002 GIS query, are rounded to the nearest tenth of a mile, and include all inventoried Forest roads as well as other known roads that are not under Forest Service jurisdiction.

Benefits

When considering effects of roads on natural resources, it is relatively simple to compile a list of existing or potential negative effects that roads can have on any single resource area. It is much more difficult to quantify all of the benefits that roads provide for human uses. The road system in the analysis area continues to serve a wide variety of resources, including recreation, timber, range, fuels management, fire protection, minerals, special and permitted uses, and access to private property. In addition to roads, other man-made routes within the analysis area include trails, snowmobile routes, overhead electric power lines, buried phone and tele-communication cables, and irrigation ditches.

Providing a reasonable and efficient road access system within the analysis area remains critical to being able to sustain all of these activities at a reasonable cost.

Problems and Risks

In recent years most of the available funding has been directed towards maintaining the Forest Arterial and Collector roads (Level 3 to 5 roads), which receive the highest traffic use. The maintenance needs of local roads (Level 1 and 2 roads) have often been deferred, because the funds to maintain the roads to standard are simply unavailable. The overall result is that much of the Forest road system is in a downward or deteriorating condition, and this is particularly true for many Level 2 roads (maintained for high-clearance vehicles only), which remain open despite receiving little routine maintenance. Maintenance Level 1 roads are placed in a closed status, and should not require much maintenance beyond periodic monitoring. But many closures, including those in the analysis area, have not been effective and have been breached.

Recent road condition surveys indicate that most of the roads in the Southeast Galena analysis area have at least some deferred maintenance needs, which can have undesirable effects on both user safety and other resource values. The amount of deferred maintenance work needed varies greatly from road to road.

The overall result of all of these existing conditions is a need to reduce road related problems and risks in the analysis area. This can be accomplished in a variety of different ways, including road improvements, relocation, closures, and decommissioning.

Desired Road System Conditions

The desired goal is to provide a road system that is safe, affordable, has minimal ecological impacts, and meets immediate and projected long-term public and resource management needs. Resource management needs are largely based on **LRMP** direction, including management area prescriptions. The current **LRMP** provides general direction for transportation system management and states: "Roads will be planned, designed, constructed and maintained to the minimum level necessary to meet integrated land management objectives (i.e. the needs of all the resources)." The **LRMP** also includes management direction to reach specific maximum open road density standards for winter range, summer range, and wildlife emphasis areas (**LRMP**, TABLE I-1), which are to be monitored on a ***watershed*** basis.

This roads analysis focused on recommendations for moving the areas transportation system towards desired conditions, as identified in the ***Galena Watershed Analysis***, including:

- Identifying roads that are no longer needed for management activities;
- Identifying roads that are needed on an intermittent basis, and determining which roads should be closed;
- Reconstructing or relocating needed roads or road segments that are causing unacceptable impacts to riparian areas;
- Improving road drainage or drainage structures on both open and closed roads;
- Armoring stream crossings on most native surface roads to reduce road related sediment delivery to streams;
- Reducing road densities in subwatersheds that are functioning at risk or functioning at unacceptable risk;

- Designing and installing road drainage on new and existing roads that requires minimal maintenance;
- Reconstructing roads that will be kept open to meet user safety needs, and accommodate expected traffic levels;
- Prioritizing road decommissioning activities and road maintenance needs;
- Meet road density management goals for big game.

General Issues

The general issues related to road construction, reconstruction, relocation, maintenance, decommissioning, closures, and other road management actions typically include:

Economics -

Although an adequate transportation system is essential for managing vegetation and other resources, current and projected funding levels for road maintenance are not likely to adequately cover the total road maintenance needs for the existing transportation system. Potential funding associated with vegetation management activities may not be enough to sustain road construction, reconstruction, and maintenance needed for those activities.

Aquatics and Water Quality –

Roads interact and influence the production and movement of both fine and coarse textured sediment, impacting water quality. Roads can capture and channel surface flows, and road cuts can intercept subsurface flows and convert them to surface flows, routing water more quickly to adjacent stream channels. Road location inside riparian areas can alter the meander patterns of adjacent streams, affecting a stream's ability to move sediment. Roads within riparian areas potentially affect a host of processes and resources associated with the areas, such as the availability of large wood, access to streams by recreationists, and movement of wildlife from upland areas to and through riparian areas.

Roads influence the health and distribution of fish and other aquatic species by several mechanisms. Impacts to riparian areas may include loss of streamside shade (influencing water temperatures), loss of riparian vegetation, soil compaction, loss of floodplains, destabilization of adjacent stream reaches, changes in sediment levels and routing, poaching, vandalism, and litter. Culverts at stream crossings often present barriers to passage for some aquatic species during some flow conditions. Road management and maintenance activities can also impact stream channels and aquatic species, depending on factors such as the age of a road, type of surface material, proximity to the stream, the number and type of stream crossings, and the type of management and maintenance activities.

Terrestrial Wildlife -

The Forest road network can alter wildlife habitats and negatively impact wildlife populations. Generally speaking, human influences on the forest are greatest near roads and decrease steadily with increasing distance from roads. The Forest ***Land and Resource Management Plan*** established standards and goals for open road densities to reduce impacts on wildlife species (to be monitored on a watershed basis).

The two most significant negative effects of roads on terrestrial wildlife are that they provide avenues for resource extraction and human activity, and they can present barriers to wildlife movement.

Resource extraction, particularly timber harvest, can fragment and degrade wildlife habitat. Increased human activity typically leads to increased wildlife disturbance. Increased access may increase hunting pressure on species such as deer, elk and bear. Most hunters camp and hunt close to roads.

The barrier effect is sensitive to road width and traffic density. As road widths increase and the amount of traffic increases, roads become more effective barriers to wildlife movement.

Botanical -

Historically, roads were built along riparian lowlands and ridgelines due to both economics and feasibility. When roads are constructed, road cuts and fills alter the existing habitat. This can result in changes to drainage patterns, soil distribution, and allow introduction of noxious weeds, and may cumulatively result in alteration of the existing plant community.

People, animals and machinery move noxious weeds from place to place. Open roads provide frequently disturbed habitats, which favors the establishment of weeds. Weed populations are often found along road shoulders, in dispersed campsites, hunting camps, trailheads, timber harvest landings, or anywhere ground-disturbing activities occur. Road maintenance activities can also contribute to the spread of weed seed along the roadway, including through haul of materials to and from quarry sites and waste disposal areas.

Fire and Fuels -

Roads have both a positive and negative effect on wildland fire suppression and fuels management. As a benefit, road networks provide access to water sources, lookouts, helispots, and other resources needed for fire suppression and fuel management activities. In roaded areas, response time is reduced, thereby increasing firefighter efficiency and effectiveness in suppressing both human and natural fires.

Roads also provide barriers or fire breaks for fire suppression and fuels activities. From a safety standpoint, roads provide anchor points for construction of fire-lines, and provide escape routes and safety zones.

Forest roads and other forms of transportation systems also have negative impacts, including an increased risk of human-caused fires. Human-caused fires along roadways in the Forest tend to have a random distribution.

Forest Products -

Roads provide access to the forest for planning, designing and implementing a wide range of vegetation management activities. The roads also provide access for equipment used for logging and harvesting operations, and provide access for people and equipment needed to complete subsequent vegetation management treatments. Most timber harvest occurs within 1,500 feet of a road, because economics favor using either skyline or ground based harvesting methods compared to more expensive helicopter logging systems.

In addition, roads provide access for gathering special forest products such as Christmas trees, mushrooms, posts and poles, and firewood. Non-timber products such as firewood and fence posts, are usually collected relatively close to roads.

Recreation -

Maintaining a viable road system is key to providing the diverse recreation settings desired and identified in the LRMP. At the same time, the existence and/or condition of roads could contribute to overuse and, ultimately, a diminishment of some visitors' recreation experiences.

The Forest provides recreation settings of varying characteristics ranging from large, remote undeveloped areas to small, easily accessed and highly developed sites. The analysis area includes two developed campgrounds, the Middle Fork Campground and Deerhorn Campground. There are also a relatively large number of dispersed campsites, which are used primarily by hunters.

The existing road system provides adequate access to dispersed camping sites. The analysis area also includes several trails and trailheads. Some trails and trailheads have adequate road access, but access to others is only marginal or in some cases inadequate to meet the current level of demand and use.

Heritage -

Heritage Resources include many forms of archaeological, historical, and cultural properties. Archaeological sites typically exist in the form of surface and subsurface deposits of stone tools and debris resulting from tool manufacture and maintenance. Road construction, maintenance, use, and associated erosion can potentially destroy or damage the integrity of archaeological deposits.

Historic sites, in contrast, exhibit a broader range of artifact types, materials, and features. They sometimes include standing structures as a dominant component, though an archaeological component may also exist. Historic properties also include engineering features and travel corridors, such as early roads, trails, railroad routes, monuments, dams, and bridges. Some existing roads were developed or constructed over historic transportation routes, particularly old railroad grades.

Traditional Cultural Properties (TCP's) are places associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world. Traditional cultural activities of contemporary indigenous communities are often practiced at such places. TCP's may not be marked by discernible physical remains.

Social –

Two thirds of the analysis area has historically had ample motorized access, while the remaining third of the area is essentially roadless. As a result of publicity generated by opponents and supporters of the past ATM planning and implementation, there is a heightened awareness on the issues of motor vehicle access on the Forest. Many snowmobilers, four-wheel drive enthusiasts, and all terrain vehicle riders are strongly opposed to any loss of motorized access. Proposals to close, decommission, or construct any significant amount of roads is usually controversial, and will be met with both strong support and strong opposition from various interest groups.

Road Densities-

The Forest **LRMP (**Chapter IV, Desired Future Conditions) provides direction to address road related concerns for fish and wildlife: 1) By the year 1999 - Maximum open road densities of 3.2, 2.2, and 1.5 miles of open road per square mile area in summer range, winter range, and wildlife emphasis areas respectively; 2) By the year 2039 – Road closures, both year-around and seasonal, will have achieved open road densities of 1.5 and 1.0 miles per square mile area in summer and winter range respectively. The road densities are to be monitored on a watershed basis.

The regulatory agencies, the **United States Fish & Wildlife Service** (USFW) and **National Marine Fisheries Service** (NMFS), use total road densities as an indicator of watershed function. The matrix of pathways and indicators for bull trout (USFW-1998) lists watersheds with total road densities of <1 mi/mi^2 with no valley bottom roads as **Properly Functioning**, 1-2.4 mi/mi^2 with some valley bottom roads as **Functioning at Risk**, and densities over 2.4 mi/mi^2 as **Functioning at Unacceptable Risk**. The matrix of pathways and indicators for steelhead (NMFS-1996) lists watersheds with total road densities of <2 mi/mi^2 with no valley bottom roads as **Properly Functioning**, 2-3 mi/mi^2 with some valley bottom roads as **Functioning at Risk**, and densities over 3 mi/mi^2 with many valley bottom roads as **Not Properly Functioning**.

But utilizing total road density as the primary measure of potential impact to riparian species and function is simplistic at best. The real or potential resource impacts of any road are dependent on many variables. The condition of both open and closed roads is a critical factor when considering the magnitude of resource impacts that result from use of roads for management activities, recreation, or other permitted uses. The assumption in using total road density is that all roads are either similar, or the same. But they are not the same. There are big differences between open roads and effectively closed roads. There are also big differences between valley bottom roads located immediately adjacent to a stream and those located a significant distance from streams. In terms of road related impacts to resources, some roads can cause enormous problems; others have little impact at all. If roads are not the same, the concept of using total road density as a primary indicator of watershed function is flawed.

An alternative to relying on road density standards is to identify the actual road impacts through an analysis process like a roads analysis or watershed analysis, and to monitor accomplishments of the restoration needs identified through the analysis. Monitoring accomplishment of the restoration needs is more meaningful than measuring changes in road densities, and has the potential to provide much greater benefits to affected resources.

Summary and Conclusions

General-

Road condition surveys indicate most of the roads in the analysis area have at least some deferred maintenance needs related to user safety and or other resource concerns. This analysis identified many opportunities to reduce road related problems and risks within the analysis area through improvement of existing roads, relocation of some road segments, closing some roads that are currently open, and decommissioning roads that are no longer needed. Some of the road condition information and recommended improvements are already entered into the Forest INFRA roads database, but much of it is available only in the form of field notes and forms that were used as each road was individually assessed for this analysis.

Implementation of the recommended changes to the road system in the analysis area will help put into place a road system that better fits today's needs for access. Cumulatively, these changes will significantly reduce the total road miles, total road density, open road density, RHCA road miles, and the overall road related resource impacts in the area. As the road system is "downsized", more users will be concentrated on fewer miles of open roads, and it will be critical to make improvements to many of the roads that remain open. As most or all of the recommended changes are implemented, they will also provide for increased user safety, a reduction in Forest Service liabilities related to safety, and a reduction in the level of funding needed to maintain the road system that remains in the analysis area.

The most significant opportunities to reduce road related impacts from roads that are recommended to remain a part of the transportation system involve improvements to road drainage systems. The function and efficiency of road drainage systems is critical to minimizing erosion and reducing road related impacts to streams, water quality, and other aquatic resources. The type of work needed is essentially improving or installing road drainage so that it: 1) requires minimal maintenance, 2) adequately disperses intercepted water, and 3) hydrologically disconnects the roads from drainages to the extent feasible. Other road improvements that can reduce road related impacts include upgrades to road surfacing materials.

Funding Opportunities

Funding to implement recommended changes to the road system could be derived from many different sources. Maintenance and reconstruction of roads can often be accomplished in association with timber harvest activities; road closures and decommissioning can also be funded through harvest activities if the same roads are used for timber haul. Appropriated funding can be used to accomplish some road improvement work, particularly work that fits the definition of road maintenance, but the amount of funding available has been very limited, and is likely to remain so in the foreseeable future.

A lot of the recommended work would be most readily accomplished through other internal or external funding sources. This type of work would include replacing culverts that are generally functional other than problems with fish passage, road decommissioning, road closures, and major drainage improvements on roads that are not planned for any timber activities likely to occur in the near future. Other internal funding sources could include Capital Investment Funds, Deferred Maintenance Funds, Demo funds, and 10% funds. Possible external funding might include Title II funding, challenge cost-share agreements, BPA funding, and other sources.

Priorities for Road Restoration Work

Virtually all of the changes will require identifying and securing some source of funding to accomplish the work. Finding and pursuing the best source of funding to accomplish the recommended changes will be key to timely accomplishment of the work identified. Some of the recommendations will require decisions through the NEPA analysis process, and consultation with regulatory agencies before they can be implemented. Other recommendations can be implemented as road maintenance, which will not require NEPA analysis. So despite what the overall priorities for resource protection or improvements might be, the timing of accomplishment will be dependent on how and when funding opportunities occur and other pre-requisite needs are met.

The road tables in Appendix B identify which road segments have identified work needs, and whether the needed work relates to closures, decommissioning, maintenance, reconstruction, etc. The tables also identify whether or not specific road segments are expected to be used for timber harvest or haul activities in the near future. But predicting if and when any future harvest activities will take place is uncertain at best. All of these variables need to be considered in determining what type of funding is most appropriate to accomplish implementation of specific changes to the access system.

All other factors being equal, it would be best to accomplish as much work as possible in association with harvest activities on roads that are likely to be used for those activities. But those same roads may have urgent needs that cannot wait until harvest activities are underway.

Recommendations to implement changes and or improvements to the area road system should generally be prioritized or focused as follows, in order of decreasing importance:

- Roads in RHCA areas along fish bearing streams with T&E Species, with granitic or Clarno soil types;
- Roads in RHCA areas along fish bearing streams with T&E Species, with soil types other than granitic or Clarno soils;
- Roads in RHCA areas along fish bearing streams without T&E Species, with granitic or Clarno soil types;
- Roads in RHCA areas along fish bearing streams without T&E species, with soil types other than granitic or Clarno soils;
- Roads in RHCA areas along non-fish bearing streams with granitic or Clarno soil types:
- Roads in RHCA areas along non-fish bearing streams with soil types other than granitic or Clarno soils;
- Roads outside of RHCA areas with granitic or Clarno soil types;
- Roads outside of RHCA areas with soil types other than granitic or Clarno soils.

This prioritization is not intended to be absolute, as there are likely to be other factors that might be more important in specific cases, such as a plugged culvert that requires immediate attention.

Recommended Changes to Access System

Fish Passage - Road Crossing Problems

In 2001 the Forest initiated a Forest-wide evaluation of road crossing sites where structures exist that could present barriers to fish passage. The evaluation process included surveys and assessments at each identified crossing site on fish bearing streams. The surveys were completed at most of these crossing sites located within the project area. The information collected was entered into a database, and further evaluated to determine whether individual sites present a barrier to any life stage of native fish, under any flow conditions. If the results indicate the crossing does not present a barrier to any life stage of native fish under any flow conditions, the crossing was rated as **green**. If the results indicate the crossing does present a barrier to some life stage under some flow conditions, it was rated as **red**. If the information collected was not sufficient to clearly indicate one way or another, the crossing was rated as **gray**, meaning that a more detailed analysis is needed to determine whether the crossing is a barrier or not. The table that follows indicates the results for all of the crossings evaluated to date; the numbers in the table are expected to change some as the database is refined and sites not yet surveyed are completed and entered.

Table 4 – Fish Passage at Road Crossing Sites

SWS NAME	Total Culvert Crossings	Green	Gray	Red
Davis/Placer Gulch	1			1
Vinegar	7	1	1	5
Vincent	6	1		5
L.Boulder/Deerhorn	4	1	1	2
Tincup/L.Butte	8		2	6
Butte	3	1		2
Granite Boulder	4			4
TOTAL	33	4	4	25

Priorities for modification or replacement of the structures have not yet been developed. Funding to modify or replace these structures is typically not available associated with timber sales. But once the priorities have been established, the Forest plans to pursue other funding opportunities to begin modification or replacement of all problem structures in the project area.

In addition to the existing culvert repairs or replacements, other work needed to improve fish passage includes installation of a large (fish-friendly) culvert to replace the existing ford where road 2614000 crosses Davis Creek. This installation could be funded in association with harvest activities if the road is used for timber haul.

If the recommended connecter road across Deerhorn Creek to access the east half of the Deerhorn subwatershed and Little Butte subwatershed areas is constructed, either a large culvert or a bridge will need to be installed at the crossing site. This work could be funded through harvest activities if the road is constructed in association with harvest activities.

Roads with Deferred Maintenance Needs

Most of the roads in the area have maintenance needs that have been deferred over time, and virtually all of them would benefit from drainage improvements. The amount of work needed varies from road to road, but typically includes one or more of the following work activities: adding or repair of drainage structures (culverts, drain dips, grade sags, rocked fords, and cross ditches), surface and ditch blading, spot rocking, surface rock replacement, brushing, constructing additional turnouts, and other work related to either safety or resource protection.

The District Hydrologist raised a concern that there are few stream crossing sites, where the existing culvert is properly sized and placed at the correct stream gradient, but the culvert elevation, tends to hold entrenched streams at an artificially low elevation. This occurs where the stream reach was already entrenched or down-cut at the time the crossing was originally installed, usually a result of disturbances that occurred prior to the road construction. These conditions result in the stream channel becoming isolated from its adjacent floodplain.

Where entrenched stream reaches exist, and as large wood naturally enters the stream channel and or as other channel improvements are implemented, the desired goals include natural channel recovery and re-establishing connections between the former floodplains and adjacent stream reaches. The extent of this type of problem in the analysis areas has not yet been identified, but when culvert replacements or repairs are planned in stream reaches where entrenchment or other alterations to natural conditions have occurred, it is critical that the culvert installations be carefully planned and designed to help promote channel recovery and complement other watershed improvements in the adjacent stream reaches.

Roads Recommended for Reconstruction

Approximately 16 miles of roads in the analysis area are recommended for reconstruction. In some cases this is because roads or road segments need to be relocated outside of RHCA's, and in other cases the roads need substantial improvements before they can meet access needs.

Reconstruction – Relocation

In cases where long-term access is still needed but a portion or segment of the existing road is located where it severely impacts riparian and streamside areas, the segment(s) that are poorly located are recommended for decommissioning. Approximate relocation routes are displayed on the maps in Appendix B. All of the relocated segments are recommended to be open for public and administrative use. Where the relocated segments occur, the intent is not to reduce motorized access, but to reduce resource impacts associated with motorized access. This road analysis recommends approximately 3.3 miles of relocated road segments.

Reconstruction – Improvement

There were about 12.7 miles of roads identified that are recommended for reconstruction improvements. These are all roads that were identified as needed for long-term access in the analysis area, but they were not originally constructed to a standard that allows for efficient use for the type of access needed. The improvements recommended will result in the roads becoming higher standard facilities than they were originally constructed to. These include: 1) several miles of local roads, 2) two roads that are "collector" or primary access routes which are in need of major improvements, and 3) several segments of existing roads, that when combined with some relocated road segments would provide a "collector" road where this type of road is needed for management and other uses, but no efficient facility currently exists (Deerhorn connector road). Descriptions of the three primary access routes in need of reconstruction are included in the paragraphs that follow.

--Road 2010 – Vinegar Hill Road

This road is one of the two main access routes to the Vinegar Hill – Indian Rock Scenic Area. It provides access to two trailheads, and receives relatively heavy recreational use. The road is in relatively good condition up to about milepost 7.8 (about a half mile below the Blackeye Trail trailhead), but beyond that point it needs major improvements to drainage, the road surface, and some other improvements related to user safety. The existing maintenance level of the first 7.8 miles is **3**, and the objective maintenance level is also **3**. The existing maintenance level for the remainder of the road is **2**, and the objective maintenance level is **3**.

--Road 2610 - Dixie Lookout Road

This road accesses the Dixie Mountain Lookout, the Dixie Mountain Communications Site, and receives relatively heavy recreational use, particularly by hunters. The road is currently in relatively poor condition, the road drainage is mostly dysfunctional, and it needs some major work related to user safety. The existing maintenance level for this road from the beginning at US Highway 26 to milepost 4.25 is listed as **3**, and the objective maintenance level is **3**. But based on recent road condition surveys, the real current condition is **2** at best. The existing and objective maintenance level from milepost 4.25 to the lookout at milepost 5.45 is **2**.

--Road 2614000

Based on this analysis, Segments of road 2614, 2614402, and 2614452 located west of Davis Creek and east of Deerhorn Creek are recommended for reconstruction, into a single road that would serve as a collector road for the area. Beyond the Davis Creek ford the existing road segments are primitive, and there is a real need to develop a collector road to provide access for general management activities, including fire protection and suppression. The section of road 2614 past the ford on Davis creek would be decommissioned and replaced with a new segment that is relocated outside of the RHCA.

Roads Currently Closed or Recommended for Closure

Roads that are placed in a closed status are not all equal with regard to access or resource impacts. Roads that are in a closed status, where closures are effective, can significantly reduce maintenance funding needs and resource impacts. Some roads that are needed for access for several different types of uses, and other roads are needed primarily only when timber harvest activities are taking place. Roads that are needed only for timber harvest on an intermittent basis with long intervals between uses (10 years or more), are recommended for placement into an "inactivated" status whenever this is practical (see Glossary).

As decisions to implement new closures or re-close existing closed roads are developed, the method of closure, the type of closure device, and the location of the closure device need to be designed specifically for each road. The objectives of a road closure can only be met if the closure is effective, and implementing successful closures is critical to the credibility of future access and travel management actions.

Some new road closures can be implemented through timber sale activities, while new closures on roads not used for timber harvest will require securing other types of funding.

Roads with Recommended Changes in Open or Closed Status

--Currently Open to Closed Year Around

These are roads that are currently open that are recommended for year around closures, either to prevent resource damage or meet other Forest Plan standards and goals for road densities. The analysis identified approximately 20 miles of currently open roads that are recommended for a change in status to year around closures.

--Currently Open to Seasonal Closure

The analysis identified approximately 12.5 miles of roads that are currently open that are recommended for seasonal closure (December through March) to meet goals for Winter Range big game habitat.

--Currently Closed to Open

This analysis identified about 7.9 miles of roads that are currently closed, that are recommended for change to an open status. These road miles include:

- About 3 miles of roads that are currently "disconnected" in the area west of Deerhorn Creek;
- About 2.4 miles of road that is needed to access a proposed trailhead relocation for the Davis Creek Trail;
- A portion of road 2010072. If this road is opened, it will provide motorized access to an area where very little access is currently available, and it already has an improved (crushed aggregate) surface. The existing closure device has only been partially effective, and has often been breached. The reason the existing closure was implemented was for wildlife habitat; even with this road open the road densities in the watershed will meet all LMRP standards;
- And a few other road segments that will improve available access to mining claims, dispersed recreation sites, and other needs.

Current System Roads Recommended for Decommissioning

The analysis recommends about 62 miles of existing classified roads for decommissioning, including about 16 miles of road that are currently open, and 46 miles of roads that are currently closed. Over 23 miles of these roads are located within RHCA areas. Roads that are recommended for decommissioning were selected based on one or both of the following criteria:

- The roads that are no longer needed for access or management;
- Access is still needed in the local area, but the existing road or segment is located in an RHCA and use is resulting in resource damage; in these cases, each road was evaluated

to determine if relocation or improvements to the existing road was the best long-term solution. For roads where relocation was determined to be the best solution, the existing road or road segments are recommended for decommissioning.

Road segments recommended for decommissioning include segments of three roads that currently access mining claims, but none of these claims are known to have active operations in progress, and the Forest has not received plans of operations for them in recent years. These include segments of road 2614, road 2010101, and road 2010292. As plans to implement recommended decommissioning of roads are prepared, a thorough review of the most recent list of mining claims and Plans of Operations needs to be done.

If the mining claims remain active, for the short term it is recommended that only the segments beyond the claim be decommissioned, and that the segments needed to access the claim be closed and available by permit only. This is necessary to provide reasonable access for proposed mining activities if the claims are still active. Because new mining claims can be filed or existing ones allowed to lapse at any time, review of the most recent mining claims records should be done as part of any plans to implement road decommissioning.

--Road 4559 (North of Junction with Road 4559283)

An intense rainstorm in the summer of 1998 triggered a debris torrent that swept down Lemon Creek, plugging and washing out road crossings as it moved down slope. The Lemon Creek crossing of road 4559 was among the sites damaged. Although this crossing had a relatively large diameter culvert, it was completely plugged and water was diverted water both over and down road 4559 for several hundred feet. As an emergency measure to prevent further damage to the road and other resources, the culvert and some of the debris were removed to restore Lemon Creek back into its natural channel. A temporary road closure barricade was placed just downstream from the damaged area.

Road 4559 is located within the Granite Boulder Creek RHCA, which is a Bull Trout occupied stream. The segment beyond Lemon Cabin is an old mining road, with a native surface, which has never been constructed to any Forest Service standard. It does not have functional drainage, and opening it to motorized use without major reconstruction would allow a substantial and chronic sediment delivery into Granite Boulder Creek. There is also an old wooden bridge located just above the Lemon Cabin site, which is currently failing and unsafe for any motorized use. Restoring this road segment would require installing a large culvert or a bridge at Lemon Creek, major road drainage and surface improvements, and replacement of the failing bridge over Granite Boulder Creek. The road is not needed for any foreseeable harvest activities.

Prior to this event (1994) the road was closed at approximately milepost 2.5 with a locked gate for "watershed improvement", and the road beyond the closure has both an operational and objective maintenance level of **1**. The closed segment of the road previously provided motorized access to Lemon Cabin, a trailhead for one end of the Blackeye Trail (within the Vinegar-Hill Indian Rock Scenic Area), and some mining claims (no longer active).

Motorized access to the 4559 Blackeye Trailhead has not been available since 1994, and plans for modifying the trail system to reflect lack of motorized access have been underway for some time. Restoration of the segment needed to access the trailhead was considered with this analysis. Based on this analysis and the overall high costs compared to low benefits of restoring the road segment, it is recommended that the segment of road 4559 beyond its junction with road 4559283 (approximately milepost 2.1) be decommissioned.

Previously Decommissioned Roads

Current restoration standards for decommissioned roads are different than those that were used by the Forest in the past. Under current standards, when a road is decommissioned, the restoration work needs to leave the roadbed in a hydrologically disconnected state. Knowing that at least some of the previously decommissioned roads in the analysis area probably did not fully meet restoration goals, previously decommissioned roads inside the analysis area were assessed to determine the effectiveness of past work.

--Previously Decommissioned Roads Needed for Long-Term Access

Some of the road decisions implemented through previous ATM plans inadvertently overlooked some of the long-term access needs for the area. During this analysis it became apparent that there were three roads that were previously decommissioned and taken off the road system, that are still needed for long-term vegetation management in the analysis area. In both of these cases, waterbars or cross ditches were constructed in the roads, and they were then blocked with large troughs and berms and left to re-vegetate naturally. The roads were not re-contoured, so full road prisms are still present on the landscape. This analysis recommends that roads 2010311, 2010430, and 2010771 be placed back on the Forest Transportation System. These roads have a combined length of 2.2 miles, and their length is included in the miles recommended for new construction. After harvest activities are completed these roads are recommended for long-term closure or "inactivated" status.

--Previously Decommissioned Roads in Need of Additional Restoration Work

As a result of these surveys approximately 20% of the total road miles that were previously decommissioned were determined to need additional restoration work to meet today's standards for decommissioned roads. Of these miles needing additional work, approximately 70% need only relatively minor work (mostly hand work), while the 30% are in need of more extensive work that will require equipment use and access (to remove culverts or do similar work).

Recommended New Construction Routes

--General

During the analysis process the potential need for constructing new access into some areas was identified. Some of these would only be needed for timber harvest in specific areas, while others are needed for access for multiple resource needs. The total road miles of potential new construction identified is 18.8 miles (including the 2.2 miles of existing decommissioned road recommended to be returned to classified road status). If new roads are constructed to access areas for timber harvest only, it is expected that new roads would not be open to the general public for motorized access. Motorized use would probably be only for harvest activities, and once those activities are completed, motorized use will be available only on a permit basis.

The approximate locations of possible new access routes are displayed on the maps in Appendix B. This analysis did not attempt to identify or analyze the potential need for temporary roads for short-term timber access, and it is possible that with further field review, temporary roads could better provide access to some of the locations where it is displayed as proposed classified road.

--Deerhorn Creek Connector Road, and Rationale

This analysis determined that there is a need to provide long-term vehicle access to the Little Butte Creek drainage and the west half of the Deerhorn Creek drainage, for general management activities and for fire protection and suppression in the local area. There are some existing classified roads in this area, but all of them are currently inaccessible. They became inaccessible or disconnected a few years ago when a portion of road 2000020 was decommissioned to prevent resource damage. Before that segment was decommissioned, it allowed at least seasonal access to other roads from Grant County Road 20, by using a ford that crossed the Middle Fork of the John Day River.

The recommendations of this analysis include constructing a connector road, from near the current end of Forest Road 2614452, which would tie into portions of the existing road system to the west. Some of the currently disconnected roads are recommended for decommissioning, and others are recommended for reconstruction and to remain a part of the transportation system.

Future Road System

The future road system that would result if all of the recommendations from this road analysis were implemented is displayed on the "future condition" map in Appendix C. The net changes from the existing road system if all of the recommended changes were implemented are shown in the table that follows:

Table 5: Future Road Miles and Road Densities by Subwatershed*

SUBWATERSHED	Total miles	Total road density (miles of road per square mile)	Open miles	Closed miles**	Open road density (miles of road per square mile)
Davis/Placer Gulch	37.4	3.2	18.4	19.0	1.6
Vinegar	35.1	3.0	20.3	14.8	1.7
Vincent	29.1	4.9	10.6	18.5	1.8
Little Boulder/Deerhorn	36.6	2.1	17.1	19.5	1.0
Tincup/Little Butte	32.1	2.8	12.0	20.1	1.0
Butte	20.7	2.7	7.2	13.5	0.9
Granite Boulder	31.4	2.7	11.1	20.3	1.0
GRAND TOTAL	**222.4**	**2.9**	**96.7**	**125.7**	**1.3**

* **NOTE:** Includes 18.8 miles of recommended new construction

****NOTE:** Includes about 12.5 miles of seasonal closures

The numbers and mileages listed are based on a 6/26/2002 GIS query, are rounded to the nearest tenth of a mile, and include all inventoried Forest roads as well as other known roads that are not under Forest Service jurisdiction. Comparing the above table with Table 3 on page 13 displays the magnitude of recommended changes to the existing transportation system.

ANALYSIS QUESTIONS

EF1 – EF5	*Ecosystem Functions and Processes*
AQ1 – AQ14	*Aquatic, Riparian Zone, and Water Quality*
TW1 – TW4	*Terrestrial Wildlife*
EC1 – EC3	*Economics*
TM1 – TM3	*Timber Management*
MM1	*Minerals Management*
RM1	*Range Management*
WP1 – WP3	*Water Production*
SP1	*Special Forest Products*
SU1	*Special Use Permits*
GT1 – GT4	*General Public Transportation*
AU1 – AU2	*Administrative Use*
PT1 – PT4	*Protection*
UR1- UR5	*Unroaded Recreation*
RR1 – RR5	*Roaded Recreation*
PV1 – PV4	*Passive-Use Value*
SI1 – SI10	*Social Issues*
CR1	*Civil Rights and Environmental Justice*

ECOSYSTEM FUNCTIONS AND PROCESSES (EF)

EF1: ***What ecological attributes, particularly those unique to the region, would be affected by roading of currently unroaded areas?***

The Dixie Butte and Greenhorn Roadless Areas provide quality habitat for species that require large contiguous blocks of old-growth forest including such species as pileated woodpecker, pine martens and fishers. Species which are particularly sensitive to habitat alternation or disturbance, such as wolverine, marten, fisher and lynx, likely benefit from the relatively undeveloped condition of these areas. Elk and deer use the area for both summer and winter range; elk, in particular favor the isolated conditions for security and low level of disturbance. Both the Dixie Butte and Greenhorn Roadless Areas may be more important now than in the past in supporting species viability and biodiversity, due to cumulative degradation and loss of other habitat in adjacent landscapes. New roads in unroaded areas may adversely affect those species listed above.

EF2***: To what degree do the presence, type, and location of roads increase the introduction and spread of exotic plant and animal species, insects, diseases, and parasites? What are the potential effects of such introductions to plant and animal species and ecosystem function in the area?***

There are no known sites of sensitive plant populations along open roads within the area, nor are weed infestations currently threatening sensitive species that have been documented away from roads.

The road system is a significant vector for exotic plant species and noxious weeds into the analysis area. There are currently approximately 40 identified noxious weed sites in the analysis area, most of which are relatively small. These sites have been mapped, and are have either already been placed on a GIS layer, or soon will be. Manual treatments for all of the known sites with weeds that present significant threats are planned for the coming field season and expected to continue in the future as needed.

Most known infestations of exotic plants occur along the current road system and associated areas of soil disturbance. Noxious weed species documented within the analysis area, or along perimeter roads include Canada thistle (*Cirsium arvense*), Scotch thistle (*Onopardum acanthium*), Dalmatian toadflax (*Linaria dalmatica*), St. Johnswort (*Hypericum perforatum*), houndstongue (*Cynoglossum officinale*), tansy ragwort (*Senecio jacobea*), spotted knapweed (*Centaurea maculosa*), diffuse knapweed (*C. diffusa*), and yellow starthistle (*C. solstitialis*). Other widespread exotic plant species include cheatgrass (*Bromus tectorum*), Kentucky bluegrass (*Poa pratensis*), mullein (*Verbascum thapsus*), white Dutch clover (*Trifolium repens*), dandelion (*Taraxacum officinale*), burnet (*Sanguisorba occidentalis*), birdsfoot trefoil (*Lotus corniculatus*), bull thistle (*Cirsium vulgare*), timothy (*Phleum pratense*), intermediate wheatgrass (*Agropyron intermedium*), and orchardgrass (*Dactylis glomerata*).

Roads that receive much use and recurring maintenance provide a continually disturbed substrate that is the preferred seedbed for invading exotics. By providing sites for infestation, they also provide a local seed source for subsequent spread of weeds to undisturbed forest ground.

The road system is not likely to contribute to the spread of exotic animal species, or to introduce new exotic insects or diseases.

EF3: To what degree does the presence, type, and location of roads contribute to the control of insects, diseases, and parasites?

In general, road access facilitates both the chances of spreading and the control of forest insects, disease, and parasites. Whether the control is direct (such as burning or de-barking of infested materials) or indirect (an attempt to reduce insect and disease impact by altering stand conditions), roading certainly facilitates these control efforts by allowing crews and equipment to easily access and treat infested sites.

EF4: ***How does the road system affect ecological disturbance in the area?***

Pre-existing roads have little impact upon insect and disease populations. New road construction can increase insect and disease populations when host material is cut and not treated or removed. Additional impact can occur when host trees are damaged during construction. The damaged host trees can serve as foci for insect and disease attack, allowing populations to build up and spread to adjacent lands.

EF5: ***What are the adverse effects of noise caused by developing, using and maintaining roads?***

Approximately two thirds of the analysis area is already relatively heavily roaded, and this is not known to be an issue for users or resources in this area. The LRMP for the Malheur National Forest does set maximum desired road density standards for big game summer range at 3.2 miles per square mile, at 2.2 miles per square mile for big game winter range, and 1.5 miles per square mile for Wildlife Emphasis areas. These limits are set primarily to provide adequate big game habitat. In addition, the Canada Lynx Conservation Assessment and Strategy (Ruediger et al., 2000) recommends that total road density in lynx habitat not exceed 2.0 miles per square mile.

AQUATIC, RIPARIAN ZONE, AND WATER QUALITY

AQ1: ***How and where does the road system modify the surface and subsurface hydrology of the area?***

The hydrology of the area is highly variable because of variations in historical disturbances and other controlling factors. The geology and soils vary spatially, with elevation, and in the amount of surface exposure. Precipitation varies with elevation, which ranges from about 3700 to 8100 feet. Snowmelt and precipitation intensities are controlled by local weather events, and the season, cause, and magnitude of peak flows are also variable.

As a result, the level of alteration of natural hydrology is also highly varied. In addition to the existing road system, much of the area has been modified by other historic activities including hardrock, hydraulic and dredge mining, railroad logging, and intensive sheep and cattle grazing. Although most of these activities are no longer occurring at anywhere near historical levels, the past activities altered some of the basic factors controlling the hydrology of the landscape, by removing soil, exposing bedrock and subsoils, and changing valley bottom and stream channel morphology. As a result, the hydrologic system no longer functions at its potential, and many stream channels are in a degraded but apparent stable condition.

Even the relatively large unroaded areas within the analysis area have been impacted by some of these historic activities. The hydrology of these unroaded areas is altered to some degree, which may affect down slope road/hydrology interactions. Much of the variability in the project area related to historic impacts has only recently been identified, and has not yet been clearly defined, described, or thoroughly understood.

So the effects of roads on the surface and subsurface hydrology of the area need be considered in the context of a landscape where hydrological processes have previously been (and continue to be) modified by other historical activities.

The road system modifies the surface and subsurface hydrology throughout the roaded portion of the project area, primarily in four ways, all of which contribute to accelerated and concentrated runoff:

- Roads intercept subsurface flow, bring it to the surface in cutslopes and ditches, and route it off the landscape, as surface runoff, more rapidly than in unroaded landscapes;
- Roads intercept and concentrate surface runoff from impervious surfaces, including both the roaded area and other areas of disturbance, which may have concentrated local surface and subsurface flows. These modifications tend to be more extreme in areas with clayey surface or subsurface soils;
- Roads concentrate surface runoff in ditches.
- Road culverts that are misaligned, road maintenance practices that create berms, and other roadway protection practices can isolate or continue to isolate stream channels from former floodplains, which limits groundwater interactions between the two geomorphic features and reduces access to water storage zones resulting in reduced late season flows.

Generally, where channel down cutting has occurred and caused disconnection/isolation between channels and floodplains, it was caused by activities other than roading (although early trail access may have contributed to the impairment of channel/floodplain interactions).

Accelerated and concentrated run-off modifies hydrologic function in three ways:

- Snowmelt and other runoff leave the landscape earlier in the season, increasing peak and near peak flows;
- As a result of the first modification, runoff is not captured and stored as efficiently, which reduces the amount of subsurface water available for release as summer base flows;
- Concentrated flows contribute to chronic, slightly elevated erosion, which is primarily expressed as the headward expansion and increasing size of small drainage systems, particularly in clayey and/or shallow soils and in areas of previous disturbance (see AQ2).

Problems related to interception of surface and subsurface flows are probably most pronounced on roads that are located in the lower third of the slope, especially in the toeslope area. Changes in geology and or soils commonly occur near the valley bottom, where subsurface water is often closer to the surface, and is more likely to be intercepted within the roadway. Similar concerns exist for roads traversing through "scabby" areas with shallow soils, and roads that are located down slope from these types of areas. Roads and road problems in the analysis area have not been classified by slope position with the exception of roads located in RHCA's or valley bottoms.

Surface flow is intercepted and concentrated by most roads to varying degrees, depending on the type of soil and parent material, the type of road surface, road grade, spacing between cross drains, and slope aspect.

The spacing of drainage relief structures along most graveled or improved roads is usually adequate to prevent detrimental concentrations of flows, particularly on roads through areas with deep volcanic ash surface soils. But on roads where cross drain spacing is excessive, erosion occurs in the ditches and at the outlets of drainage structures. Roads that have segments that were identified as having culvert problems or inadequate cross drain spacing include 2612878, 2612000, 2612706, 2612655, 2612621, 2010873, 2010618, 2010980, 2010993, 2010986, 2010260, 2055532, 2050072, and an unidentified road in the Butte drainage.

The problems caused by having too widely spaced drainage structures are compounded when native surface roads occur on clayey soils and subsoils or on granitics. Clayey soils tend to absorb water slowly, so a greater portion of precipitation or snowmelt will occur as surface flows, which results in an increased amount of surface flow carried by roads. Many of the roads listed in the paragraph above are located on clayey soils. Granitic soils are easily detached and vulnerable to rapid and deep gullying once an erosional nickpoint has been initiated by concentrated flows; some of the roads listed above are located on granitic soils.

Water from roadside seeps, springs, or other sources was observed on the following roads: 2010999, 2010980, 2010545, 2000020, 2055532 and 2614452. Ruts that channel water were observed on roads 2612000, 2614000, 2612878, 2010980, 2010545, 2010993, and an unidentified road in the Vinegar drainage. Roads also capture run-off that has already been concentrated in other disturbed areas upslope. The amount of runoff captured is increased when ruts have formed in the roads from wet weather use, particularly on the clay soils and especially on Clarno-like soils. Another road that was identified as having general drainage problems was road 2612570.

In some locations roads have "captured" stream channels, disrupting normal stream channel processes. In some cases, road surface elevations are below bankfull elevations, so when stream flows overflow out of their channels, some of the flood waters run down the road and cause erosion to occur. In other situations, stream channels and or flat ground immediately adjacent to them has been used for either classified or unclassified roads. Over time, the stream channel has become synonymous with the driving surface. Roads that have segments where the roadbeds that are intermingled with stream channels or constrain natural migration of stream channels include 2612774, 2614229, 2000663, 2010243, and 2614348.

Problems related to increased peak and near peak flows and subsequent reduced summer base flows are aggravated when stream channels are disconnected from the associated floodplains by roads. When culverts, berms, and other structures installed to protect roads from natural stream channel movement, the capability of floodplains to capture and store water during high flows is adversely affected. When stream channels are isolated from floodplains it also increases the risk of adverse impacts occurring during flood events, the magnitude of the hazard, and reduces the water storage capacity of the floodplains.

Several roads that have segments that present a risk of impacting riparian function or other watershed processes were identified. Generally these were located in RHCA's and lacked engineering improvements to minimize effects on aquatic resources. Identified roads include 2614402, 2614452, 2010035, 2010036, 4550694, and 2050035.

The District Hydrologist also noted that there are a few roads in the analysis area that run up and down the slope rather than across it, but was not able to identify the roads by road number. If this type of road is unimproved, the roadbed can be below natural ground level, which makes the roadbed prone to capturing and channeling surface runoff during intense rain or rapid snowmelt events. Conventional drainage structures may require long outlet ditches to be effective at controlling water in these cases, which may not be feasible on some roads. Any decommissioning or improvement activities on these types of road need to be carefully designed to provide functional drainage.

Another risk factor related to modification of natural hydrologic processes is road density. The ***Galena Watershed Assessment*** identified and displayed road densities by subwatershed. In the subwatersheds that include both designated roadless areas and roaded areas, the total road densities for the subwatersheds can be misleading. The road densities in the roaded portion of the subwatershed are significantly higher than for the overall watershed, and the potential for roads to modify surface and subsurface flows is also higher.

Landscape conditions resulting from past activities combined with natural soil conditions can result in concentrations of surface and subsurface waters, which in some cases can contribute to causing debris torrents and debris flows. When these types of events occur in channels with road crossings, the features of the road segment(s) in the draws can be heavily damaged or removed by the event. How frequently these types of slope movements occur is unknown, but a reasonable estimate is that several small ones occur annually on the Forest, with larger ones occurring on a less frequent basis (See AQ3). Roads located near the top of hillslopes could be a contributing factor to these types of events, but they are usually a result of a combination of other historical disturbances and or natural conditions. Downslope road crossings rarely increase the frequency or magnitude of these events.

The magnitude of peak and near peak flow increases is unknown, but is probably not significant enough to damage streams in properly functioning condition. This conclusion is supported by observations that in urbanizing watersheds, degradation of stream channels and fish habitat is often not measurable until impermeable surfaces approaches 10% of the land's surface assuming streams were initially in Proper Functioning Condition. However, few streams in the planning area are considered to be in Properly Functioning Condition, as a result of past impacts, and some may not be able to handle storm events larger than predicted for 25-year flood events.

Although roads do not approach this 10% threshold in the planning area, the after effects of other historic disturbance have changed the patterns of infiltration and run-off, in effect causing the rate at which water is shed in this area to move closer to that expected when 10% of the area is in roads.

AQ2: *How and where does the road system generate surface erosion?*

Surface erosion occurs on most roads because their surfaces, cut slopes, fill slopes, and ditches are often composed of erodible material, deficient in ground cover, which is exposed to runoff.

Erosion is greatest during and immediately after road construction, and thereafter declines greatly, usually within three or four years. Factors that influence surface erosion on established roads include the road surface material, ground cover, erodibility of soils, steepness of the road grade, spacing between cross drains, and the amount of runoff (especially where roads capture runoff and route it down the road).

Surface erosion within the roadway is usually relatively limited on roads with functional drainage. It is most pronounced on native surfaced roads and in poorly vegetated ditches, but some of this type of surface erosion occurs even on improved or gravel surfaced roads. Ruts as shallow as ¼ inch can form channels down the surface, concentrate flows, and cause surface erosion. These conditions are most characteristic of roads on clayey subsoils and, to a lesser extent on native surface roads on other subsoils. Similar erosion is found on roads in granitic soils. Roads that have segments with erosion problems related to ditches include 2612706 and 2612570. Roads with road surface erosion problems include 2612000, 2614000, 2612878, 2010980, 2010204, 2010545, 2010993, 2612878, 2612774, 2614263, 2010986, 2055364, 2050072, and unidentified roads in Vinegar, Deerhorn, and a small un-named drainage.

Other roads have soils and conditions similar to those listed above, and have the potential to develop the same types of surface erosion problems: 2010999, 2010980, 2000020, 2055532 and the 2614452 road, where seeps or other water was observed on the road surface.

Roads can also increase surface erosion beyond the roadway. When drainage structures are adequately spaced and located, they route the concentrated flows into areas such that additional surface erosion beyond the cross drain outlet does not occur. Roads can increase surface erosion beyond the roadway when cross drains are not adequately spaced or located. Erosion can take place around the drainage outlets and in extreme cases 50 feet or more beyond the edge of the road. This is particularly true when road drainage concentrates runoff onto scabs or other areas where water does not readily infiltrate. Road surface erosion usually has little aquatic or water quality consequences, except where roads are hydrologically connected to streams (see AQ6 below). The quantity of surface erosion entering streams is unknown, as the degree of hydrological connectivity is not well documented or inventoried.

Examples of other conditions that can cause erosion include locations where poorly drained side roads drain onto another roadbed or ditches, and locations where concentrated runoff from a road connects with a skidtrail down slope.

Stream crossings and other low points along roads typically have sediment deposits (of various depths and sizes) where runoff puddles. Road related sediment deposits also occur at grade changes or settling points along drainage paths beyond where concentrated water leaves a road. These deposits will occur along the drainage path until either the water is greatly dispersed, all of the sediment is trapped, or it enters a stream channel. These problems are most frequently seen along crossings on the clayey or granitic soils, but depending on cross drain spacing, can occur on any soil types.

Road and channel erosion also occurs in any types of soils when roads "capture" intermittent or perennial streams, which results in active erosion of the roadbed. Concentration of flows on roadbeds from blocked ditches or other sources may channel water into streams and contributing to stream bank and bed erosion and eventual mingling of stream and roadbeds.

AQ3: How and where does the road system affect mass wasting?

Mass wasting is a natural process within the analysis area, particularly in the Clarno Formation areas. Roads can increase the natural frequency of mass wasting by concentrating surface flows, intercepting and rerouting subsurface flows, and constructing artificial or unnaturally steep slopes. While mass wasting related to the road system has not historically been a significant problem in the area, road drainage and maintenance is critical to prevent it from becoming so.

Natural features of the landscape indicate that large-scale debris flows and torrents are a natural geomorphic process in the area, but that large events of this type happen very infrequently (hundreds of years or longer intervals between large-scale events). As discussed in AQ1, hillslope roads rarely initiate these types of events. They are usually result of unusual natural runoff concentration caused by natural conditions or by other historical, non-road disturbance(s). Roads may be affected if they are located where stream segments are eroded by debris flow events.

Two slumps occur along County Road 20, near Butte Creek and west of Vincent Creek. Road related slope movements are caused either by undercutting of natural slopes by road construction or where roads or other ground disturbing activities altered natural surface and subsurface drainage. Slumps in nearby subwatersheds in similar soils and geology types usually occurred as a result of concentrated water running off poorly drained roads onto marginally stable areas. Ancient slumps are also fairly common landscape features based on evidence exposed in road cuts and on mapping of "ancient landslide" material in the Soil Resource Inventory. These areas are prone to be wetter and to require additional drainage to maintain stability; when drained adequately roadbed stability is comparable to that in the rest of the project area.

AQ4: How and where do road-stream crossings influence local stream channels and water quality?

Stream crossings influence local stream crossings wherever culverts are either undersized, or misaligned. A survey of culverts on fish bearing streams was completed in the planning area during the 2001 field season and data are currently being compiled and analyzed. The results of this survey are expected to provide definitive information about culvert influences on stream channels.

Concentrated flows and or sediment are often delivered to stream channels at road crossing sites as discussed under AQ1. Concentrated flows that reach streams earlier contribute to summer temperature water quality degradation because the flows are not stored on the landscape for late season release. Determining the quantity of sediment delivery to streams at road crossings has not been done, and there are no streams in the planning area on the Section 303(d) list of State Water Quality Impaired Bodies for sediment. Sediment is delivered directly to streams at several road fords in the analysis area. Roads that have some locations where sediment delivery is chronic include 2612621, 2614229, 2010482, 2010260, 2010499, 2010429, and 2045035. Roads where the risk of sediment delivery is relatively high include 2612774, 2614000, 2612570, 2612604, 2010669, 2010376, 2010980, 2010993, 2010691, 2010101, and an unidentified road in Butte Creek drainage.

Stream crossings with culverts influence water quality and channel morphology when they are installed at elevations that resulted from previous degradation of the local stream reach. Even if the culverts are aligned properly sized appropriately, if they are installed at unnaturally low or degraded elevations, they result is continued isolation of floodplains from the channels, prevent natural channel-floodplain interactions and recovery, and increase the risk of downstream damage during high flows.

There are also a number of crossings of intermittent channels or large ephemeral draws that lack drainage structures, increasing risk of road failure and sediment delivery to downstream channels. The sites are not listed here, but are noted on existing condition maps in the Forest Hydrology department.

Some historic crossings have eroded allowing the roadbed to capture the stream or causing the stream to erode into multiple channels; roads with these conditions are listed in AQ1. Influence of road-stream crossings on water quality is covered in AQ5, AQ6, AQ9, AQ11, and AQ12 that follow.

AQ5: How and where does the road system create potential for pollutants, such as chemical spills, oils, de-icing salts, or herbicides, to enter surface waters?

Road crossings, and other close approaches between roads and streams, create the greatest potential for pollutants to enter surface waters, especially where roads are hydrologically connected to streams (see AQ6).

Risk of exposure is related to the level of activities occurring in area at a given time. When the Forest Service or adjacent landowners are conducting activities on or in the vicinity of a given road system, they are more likely to be carrying materials with potential for pollution if an accident occurs. Past chemical spills in the Galena watershed have usually been tied to periods the amount of local activities occurring was relatively high. But most Forest roads in the Southeast Galena planning area are not major transportation routes. Few are tie through roads, so most public use is just to access local forest areas. Generally, the limited use results in limited exposure to potential pollutants on these roads.

Dust abatement chemicals such as magnesium chloride or lignin sulfonate are sometimes used as prescribed mitigations for Forest management activities, and petroleum spills are also possible.

Potential for pollutants is highest along County Road 20, which serves numerous landowners and also as a local highway connecting State and Federal highways. Spills along County Road 20 could affect the Middle Fork of the John Day and the lower segments of some tributaries.

There is also a potential that the segment of the Middle Fork of the John Day in the planning area could be affected by chemical spills occurring upstream near State Highway 7 or U. S. Highway 26. Both these roads are major transportation routes, so the risk of a spill occurring is higher than along the other roads in the planning area. Pollutants from a spill along one of these roads would be diluted by the time stream flow reached the planning area, and amount of dilution would vary depending on the size of the spill amount of flow at the time of the spill.

AQ6: How and where is the road system "hydrologically connected" to the stream system? How do the connections affect water quality and quantity (such as, delivery of sediments, chemicals, thermal increases, elevated peak flows)?

A stream system consists of streams and other places with surface runoff, including draws, wetlands, and scabs. Roads are hydrologically connected at crossings and other places where roads closely approach streams, so that water and sediment from the road can directly enter a stream. "Closely approach" usually means about 25 feet or less, from road edge to channel edge. Near road crossings, the spacing of adjacent ditch relief drains and the road surface drainage affects the degree of hydrologic connectivity.

As noted in AQ2 and AQ5, the connections degrade water quality through road related sediment, and potentially by routing chemicals to streams. The connections themselves probably do not affect thermal increases, though proximity of roads to streams can affect thermal increases, by decreasing shade and woody debris, and possibly by decreasing low flows. As noted in AQ1 above, the connections increase peak flows, and on certain stream segments, increased peak flows can increase sediment.

The road system is hydrologically connected to the stream system at crossings as described in AQ1 and AQ4. Generally it appears that inputs at most crossings are relatively small but chronic, contributing cumulatively to an already disturbed landscape. Peak and near peak flows are elevated as a result of the overall disturbance. Summer base flows, consequently, are reduced, contributing to summer temperature water quality degradation.

AQ7: What downstream beneficial uses of water exist in the area? What changes in uses and demand are expected over time? How are they affected or put at risk by road-derived pollutants?

The primary beneficial uses are for cold-water fish. Fish species in the analysis area include steelhead and bull trout, which are both listed as Threatened, and chinook salmon and redband trout, which are both listed as Sensitive. Other beneficial uses include irrigation and recreation. Few changes are expected in use and demand, although as irrigation systems become more efficient and as landownership objectives change, more in-stream water may be dedicated to in-stream flow. The primary limiting factor for fish habitat is stream temperature, which is influenced indirectly by roads as described in AQ1 and other questions in the first section. The **Galena Watershed Analysis** (page 3-31) identifies the portion of the Middle Fork of the John Day River located within the analysis area and segments of eight tributaries as Oregon State 303(d) listed for water temperature.

Irrigation and recreation are affected only to a minor extent. Flow modification caused by withdrawals for irrigation affects stream temperature and other fish habitat parameters, and the resulting lower flows may affect downstream recreational use of the Middle Fork John Day River.

Road related sediment or road-derived pollutants present the greatest potential for adversely affecting fish and aquatic life. Sediment can decrease oxygen in spawning gravels and, in extreme cases sediment can cover spawning gravels, decrease channel roughness, fill in pools, decrease cover, and make the stream wider, shallower, and warmer. Thermal increases can stress and even kill cold-water fish. Chemical pollutants can also potentially stress or kill fish.

AQ8: How and where does the road system affect wetlands?

Road and road use adjacent to or lying within wetland environments can disrupt natural water flow, produce road related sediment, and increase potential contamination from vehicle use. In addition, road use and other human activities impact the quality of habitat for wildlife and aquatic species. Roads appear to have only a minor influence on the condition of the meadows along the Middle Fork of the John Day River and the adjacent low elevation meadows of the tributaries, based on observation and available information.

The wetlands along the Middle Fork of the John Day River have been affected primarily by dredge mining and river channelization (using a bulldozer). Culvert placements at tributary streams along County Road 20 appear to be holding some tributary channels at lower elevations, because of previously down-cutting, which may be affecting the recovery of meadows along the Middle Fork (i.e. Caribou Creek). As described previously, the location of culverts and road crossings along tributary streams limit the recovery of wetlands that were previously isolated from adjacent stream channels due to down cutting. Roads occasionally cross seeps, diverting their drainage and reducing the natural size of wetlands.

AQ9: How does the road system alter physical channel dynamics,* including *isolation of floodplains; constraints on channel migration; and the movement of large wood, fine organic matter, and sediment?

Valley bottom roads and roads within RHCA's and floodplains interrupt overland flows and can divert water flow into ditches and culverts, cause erosion and deliver sediment into streams. Soil disturbance of the road prism within a floodplain can contribute significant amounts of sediment into streams during periods when the floodplains are inundated during runoff events. Vehicle traffic on wet roads can cause considerable disturbance and sediment delivery to streams. Fine organic matter and natural channel migration and development are impacted where natural water flow and hydrology are interrupted. Movement of large wood is interrupted and sometimes removed for firewood by public users.

The greatest effects on these processes in the lower meadows and stream reaches are from historical activities other than roads, and the effects of those activities continue to impact these processes to a far greater degree than roads. Roads have a more significant effect on these processes in the areas further upslope, and particularly where roads continue to maintain isolation of floodplains that was initially caused by a variety of historical activities.

AQ10: How and where does the road system restrict the migration and movement of aquatic organisms? What aquatic species are affected and to what extent?

An estimated 20% of the culverts within the analysis area are not large enough to accommodate predicted 100-year flood events. Based on recent surveys, approximately 85% of the culverts on fish bearing stream reaches present a barrier to some life stage of native fish during some flow conditions. Culverts that become blocked or get washed out can also create barriers to fish and aquatic migration. Barriers adversely affect anadromous steelhead, salmon, and Bull Trout (T&E Listed Species), and resident trout in the analysis area. Other fish and aquatic species in the riparian ecosystems are also affected.

AQ11: How does the road system affect shading, litterfall, and riparian plant communities?

The removal of tree cover and ground vegetation during road construction and maintenance removes shading and the potential for litterfall. Roads in RHCA's also affect plant communities through soil disturbance, water flow alteration, plant community composition changes, and removal of large wood by woodcutters and campers. Roads provide access to RHCA's that can lead to development of dispersed campsites along streams, where disturbance and pollution often occur.

AQ12: How* and *where does the road system contribute to fishing, poaching, or direct habitat loss for at-risk aquatic species?

The road system provides fishermen access to streams throughout the watersheds, which contain listed fish species including steelhead, salmon, and bull trout. Road systems provide camping opportunities and can concentrate recreation use along streams. Increased poaching, fishing pressure, and habitat loss are direct results from road system access and camping within RHCA's. Direct habitat loss is along the streams where dispersed and developed campgrounds exist and where road stream crossings exist.

AQ13: How and where does the road system facilitate the introduction of non-native aquatic species?

There are no known incidences of introduction or stocking of non-native fish or other aquatic species within the analysis area, and the Oregon Department of Fish and Wildlife has no known plans to introduce any in the future. Road systems provide public access, and could make it easier for an illegal introduction of non-native aquatic species to occur, but this has not been a problem in the area.

AQ14: To what extent does the road system overlap with areas of exceptionally high aquatic diversity or productivity, or areas containing rare or unique aquatic species or species of interest?

Many of the aspen sites in the analysis area are currently in a decadent condition; successful reproduction is minimal, and many sites are in a state of decline as a result of a variety of impacts. The road system does provide easy access to some of the aspen sites, and those with roaded access tend to be favored as camping areas. The impacts associated with road systems and human access and activities within and adjacent to aspen clones can result in degradation to these unique species, impacting soils, water flow, and riparian qualities,

TERRESTRIAL WILDLIFE

TW1: What are the direct effects of the road system on terrestrial* species *habitat?

Roads have several effects, mostly adverse, on wildlife habitat. Road construction removes habitat, increases the likelihood of disturbance, increases competition among some species, alters animal and plant species composition in affected areas, creates movement barriers, increases mortality (trapping, hunting, road kills, etc), and increases the likelihood of poaching.

Initial road construction causes immediate loss of habitat within the roadway, by converting habitat into non-habitat. Depending upon the amount and kind of maintenance and use, the conversion can be permanent, unless vegetation grows in the roadway again.

Greater access means reduced seclusion habitat, which is very important to some species, including wolverines and wolves, which use roaded areas less than unroaded areas. Roads themselves are not a problem, but the loss of seclusion habitat is. In SE Galena, the Dixie Butte and Greenhorn Roadless Areas likely provide the best habitat for these species. Road construction is more constrained in the Vinegar Hill-Indian Rock Scenic Area and Dixie Butte

Wildlife Area portions of these roadless areas. The Forest Plan permits higher levels of management, including road construction, in the remaining portions of these roadless areas.

For species that will not cross or are hesitant to cross roads, a road becomes a barrier and fragments habitat. This can reduce habitat available for dispersing individuals and reduce the rate of gene flow within a population. The wider the road and the higher the standard, the more likely it is that an animal will hesitate or not cross it. In SE Galena, County Road 20, a paved highway, likely provides the greatest barrier to wildlife movement. Forest Service roads are often graveled or native surfaced and are less impacting; however, even lower grade Forest Service roads can cause hesitation in some animals.

In the past, roads were often constructed in riparian areas, which either degraded or eliminated riparian vegetation. About 75% of the terrestrial wildlife species found in the Blue Mountains are either directly dependent on riparian habitats or utilize them more than other habitats (Thomas et al., 1979). Wildlife uses these areas for water, shade, food and cover. These areas often provide travel corridors or migration routes. Elk and deer often use these areas for calving and fawning. Several wildlife species are strongly associated with riparian hardwoods, including Lewis's woodpecker, Williamson's sapsucker, red-naped sapsucker, downy woodpecker, and willow flycatcher. Aspen, in particular, is favored by several species for foraging and breeding.

Roads constructed through aspen stands can reduce the size of the clone and influence the water table either adversely or positively affecting aspen habitat. Aspen is a very important habitat type, used by many species for foraging and breeding. Some species, such as the red-napped sapsucker, are highly associated with aspen; they will occur elsewhere, but their density is much higher in aspen. On the Malheur National Forest, some of the greatest diversity of bird species per unit area occurs in aspen stands.

Snags as well as live trees are removed during road construction. Few snags will ever be allowed to remain near open roads because they present a hazard to the public, and because they are available as firewood. Most firewood harvest occurs legally; however, illegal cutting also occurs. Where road densities are high, the average snag density can be expected to be very low.

Roads also increase the amount of "edge" habitat that is preferred by some species. This can be a disadvantage to other species as a result of increased competition. The brown-headed cowbird is a brood parasite, laying its eggs in the nest of another species. Habitat created by road construction can allow brown-headed cowbirds into areas that previously were not suitable habitat. Some species, especially warblers, have very high nest failure rates when parasitized by brown-headed cowbirds.

Pools in roads or created by plugged culverts provide temporary habitat for frogs to breed. Eggs can be laid and tadpole reared in pools, which might increase habitat if young are able to mature and disperse before the pool dries. A pool that dries before the young mature can be detrimental to the population. Also, one vehicle trip through one of these pools could kill all tadpoles present.

TW2: How does the road system facilitate human activities that affect habitat?

Roads allow a higher frequency and density of humans than would occur otherwise. This increases disturbance and makes habitat less useable for some species. Such species as wolverine, wolf, and elk appear particularly sensitive to disturbance. Animals could be displaced from high road density areas, concentrating use into smaller areas. Increased disturbance can cause reduced reproductive success or failure for sensitive species, such as the Canada lynx, northern goshawk, and bald eagle.

Typically, greater access is a precursor to higher levels of management. In SE Galena, many roads provide access for timber harvest and associated activities. Harvest often fragments and degrades habitat, at least for those species that prefer interior habitat to edge habitat.

Roads provide additional access for camping. Near campsites, vegetation is often removed or altered. More miles of road also reduce the unroaded areas available for recreation. Recreationists seeking an unroaded experience are concentrated into limited areas, such as wilderness areas or roadless areas, which are being used increasingly. This can further reduce refugia for animals sensitive to disturbance.

Loss of snags and down wood occurs at a higher rate along roads due to easy access for firewood gathering.

Snowmobiles access higher elevations during seasons formerly not used by very many people. They compact snow, which is believed to allow carnivores, such as coyotes and bobcats, into higher country during the winter. These carnivores are thought to compete with lynx for forage, which might increase lynx mortality due to starvation, or can cause direct lynx mortality.

TW3: How does the road system affect legal and illegal human activities (including trapping, hunting, poaching, harassment, road kill, or illegal kill levels)? What are the effects on wildlife species?

Many people are not willing, or in some cases, not capable of hiking far to hunt or trap. Increased road density can mean increased hunting, poaching, and trapping. Poachers tend to stay on roads because their activity is illegal, and they want to kill and remove the animal before getting caught. Constructing roads into previously unroaded areas further reduces refugia for animals to escape from hunters, to eat, and rest.

Snowmobile routes into high country facilitate trapping. Areas that can now be accessed by a snowmobile in a day, historically took several days to access by an individual on snowshoes. The high country, which was only used by trappers willing to spend several days pursuing their prey, is now available to the recreational trapper. In some areas, trapping can seriously deplete populations.

Increased road densities can lead to increased accidental road kill. Roads with the highest standards, such as interstate highways, have the highest rates of animal mortality. However, animals can be and are killed on any standard of road as long as any types of vehicles use them.

TW4: How does the road system directly affect unique communities or special features in the area?

Roads that are built through rock outcrops, mountain mahogany or aspen stands can remove unique habitat. Mountain mahogany is used as forage by big-game animals and breeding and foraging habitat for many other species. On the Malheur National Forest, mountain mahogany is not reproducing successfully in most areas for many reasons, so the loss of individual plants or stands is important to its distribution on the forest. Aspen on the Malheur National Forest is about 5% of what was historically and now occurs only as a few individual trees or stands of a few acres. A road built through an aspen clone has the potential to entirely remove the clone.

Because individual trees in clones are genetically identical, loss of the clone can mean loss of genetic material.

Most noxious weeds are introduced along roads. Roads through unique habitats increase the likelihood that noxious weeds will become established and occupy sites otherwise occupied by native species. In the past, road cut slopes were stabilized using various seed mixtures, often containing non-native species. These species now occur within the forest as well as along roads. In some cases, these species are consumed as forage and probably don't adversely affect herbivores; however, native plant species are reduced in areas occupied by non-native plants, which can result in a reduction in forage for some herbivores. For instance, orchard grass is not highly palatable, but it occupies areas historically occupied by native plants. On the other hand, clovers, many of which are non-native, are highly palatable and are consumed by birds and mammals.

ECONOMICS

EC1: How does the road system affect the Agency's direct cost and direct revenues used in assessing financial efficiency?

The history behind the Malheur's current road system has an important role in how we consider its financial efficiency. The Forest's roads were built primarily to access timber harvest units and for other administrative purposes. High timber revenues coupled with recreation benefits and access for firefighters made the roads financially efficient to build and maintain. With recent drastic reductions in timber harvest levels, the primary source of revenue that maintained the current road system fundamentally changed. The objective of the economic questions is to address costs, budget and overall financial efficiency of the current road system.

The current road system provides both positive and negative cash flows. The major source of revenue associated with roads is timber sales. Direct costs include recurrent road maintenance and resource restoration or protection costs related to increased motorized use in roaded areas. At present, direct costs exceed direct revenues. Given current agency funding and sources of revenue, an increase in open road mileage will compound the negative cash flow. However, these costs can be mitigated or minimized if roads are properly constructed, reconstructed, and maintained, and un-needed roads are closed, or decommissioned. All foreseeable projects are likely to result in fewer miles of high-cost open road in the analysis area.

Although the direct costs of road construction, maintenance, and mitigation measures exceed the direct revenues resulting from timber, and other commodities, many resource management objectives could not be accomplished or would cost a great deal more without an adequate road system.

EC2: How does the road system affect the priced and non-priced consequences included in economic efficiency analysis used to assess net benefits to society?

The road user groups in the analysis area that contribute the most significant recreation-related economic benefits are big game hunters. These users contribute revenue through the purchase of equipment, supplies, and services for their activities. Non-local hunters contribute additional revenue by staying at local hotels, eating at restaurants, and shopping.

The construction, maintenance, or decommissioning of roads within the analysis area is not expected to have a significant long-term impact on the economic benefits derived from recreation unless there is a significant reduction in the total mileage of roads available for recreational use. Some short-term displacement of individual users may occur as a result of project related road activities.

EC3: How does the road system affect the distribution of benefits and costs among affected people?

The road system allows access for the number and amount of activities that occur in the area. Without the road system, the benefits and costs associated with hunters, recreational driving, firewood cutting, and other users would be reduced.

Snowmobiling may not be impacted by lack of a road system. The terrain's topography and vegetation cover lend themselves to allow snowmobiling with or without an intact road system. Although the road system tends to concentrate and funnel most users to certain trail areas, there is also a significant amount of off-trail and off-road snowmobile and ATV use in this analysis area.

TIMBER MANAGEMENT

TM1: How does the road spacing and location affect logging system feasibility?

The most efficient road spacing that would maximize timber stumpage values is not feasible because it would result in road densities and resource impacts conflicting with other resource management objectives. Generally, road construction is only allowed where it is determined to be economically and technically necessary to achieve resource management objectives.

The existing road system spacing and location is adequate to allow feasible harvest of most timber stands with either ground based or skyline logging systems except as noted in TM2. However, there are some stands that cannot currently be harvested without either accessing through new road construction, or using helicopter-based logging systems. Helicopter logging costs are typically not feasible for the type of timber available during current and recent market conditions.

TM2: How does the road system affect managing the suitable timber base and other lands?

The current road system is usually adequate for timber management in the Butte, Vincent, and Vinegar subwatersheds.

Portions of the Davis/Placer subwatershed also have adequate access, but the portions west of Davis Creek do not currently have adequate access. In the Deerhorn and Little Butte subwatersheds, road 2614 and branches needs relocation and reconstruction to adequately access the area between Deerhorn Creek and Davis Creek. Several segments are located in riparian areas and should be relocated. The rest are basically jeep roads that are native surface, narrow, and winding. The area west of Deerhorn Creek has no current access; the road system there is currently isolated not accessible. Timber haul is not feasible in the area west of Davis Creek at this time. Either timber harvesting must be forgone or expensive helicopter logging must be done to fly the logs out to the nearest suitable roads.

Native surface roads with inadequate drainage currently access the much of the local area west of the 2055 road in the Tincup/Little Butte subwatershed. These roads are unsuitable for timber hauling much of the year (restricted to only dry conditions). These roads need to be reconstructed to extend the time periods when they would be suitable for timber haul. The local roads east of the 2055 road were recently reconstructed by the Moe timber sale, and are adequate for timber management.

The existing road system needs a number of other changes in order to allow more efficient access for management. These include work needed on roads that have deteriorated significantly as a result of deferred maintenance and changing the status of a few roads from decommissioned to closed (these roads were previously decommissioned without the benefit of a thorough interdisciplinary analysis to determine long term access needs of the area).

Temporary roads can also be utilized in many cases to reduce the density of permanent open roads, and the associated maintenance costs. This roads analysis did not attempt to assess the long-term need for temporary roads, as they are typically identified on a project basis to meet short-term needs.

TM3: How does the road system affect access to timber stands needing silvicultural treatment?

The current road system is adequate for non-commercial silvicultural treatments throughout the Butte, Vincent, and Vinegar subwatersheds. Portions of the Davis/Placer subwatershed are also adequate, but the portions west of Davis Creek are inadequately accessed. In the Deerhorn and Little Butte subwatersheds the 2614 and branches needs relocation and reconstruction to adequately access the area between Deerhorn Creek and Davis Creek. The access needs for commercial silvicultural treatments is described in the answer to TM2, above.

MINERALS MANAGEMENT

MM1: How does the road system affect access to locatable, leasable, and salable minerals?

There are currently only about 10 active mining claims in the area. But the amount of speculation, interest, and actual level of mining activity is dramatically influenced by the market values of locatable minerals, which are currently relatively low. The number of mining claims and related activities could increase very rapidly from the current level if market prices became significantly higher. As changes in market prices occur, it will change the demand for roaded access associated with mining operations.

Three roads that are recommended for decommissioning include segments that access current claims, but neither of the claims is known to have active operations in progress, and the Forest has not received plans of operations for them in recent years. These include segments of road 2614, road 2010101, and road 2010292. As plans to implement recommended decommissioning of roads are prepared, a thorough review of the most recent list of mining Plans of Operations needs to be done, and it may be necessary to place some of the road segments in a closed status (accessed by permit only), rather than decommissioning them, at least for the short-term.

The Forest Service has a number of developed rock materials sources in the area, used primarily for aggregate surfacing for system roads. Some improvements to the existing access roads would be beneficial, but overall the access to these sources is adequate. Common variety minerals from the materials sources are available and occasionally sold, primarily for use on adjacent private lands.

RANGE MANAGEMENT

RM1: How does the road system affect access to range allotments?

The existing road system is used by both livestock permittees and for permit administration activities. Any foreseeable changes in the transportation system will maintain adequate access for these activities.

WATER PRODUCTION

WP1: How does the road system affect access, constructing, maintaining, monitoring, and operating water diversions, impoundments, and distribution canals or pipes?

There are privately owned irrigation ditch diversions on National Forest System (NFS) lands in Vinegar Creek, Vincent Creek, and Granite Boulder Creek. In most cases, the point of diversion and a portion of the constructed ditches are located on NFS lands. Proposed management activities are not expected to curtail existing access, however, coordination with these ditch owners is recommended to avoid any potential conflicts. See SU1 for more details.

WP2: How does road development and use affect water quality in municipal watersheds?

There are no municipal watersheds within or downstream of the analysis area.

WP3: How does the road system affect access to hydroelectric power generation?

There is no hydropower facility accessed by the road systems in the analysis area.

SPECIAL FOREST PRODUCTS

SP1: How does the road system affect access for collecting forest* products*?

Virtually the entire existing road system is used for collecting special forest products for personal use such as mushroom gathering. The existing road system is generally adequate for commercial special forest products, such firewood cutting, and posts and poles.

When roads are decommissioned or closed it reduces access for some of these types of uses. But most of the roads that are recommended for decommissioning are already closed, and many are located in RHCA areas, where firewood cutting and other harvests are already prohibited. Any foreseeable changes in the area transportation system are expected to maintain adequate access for these types of activities.

SPECIAL USE PERMITS

SU1: How does the road system affect managing special-use permit sites (concessionaires, communications sites, utility corridors, and so on)?

This analysis area contains 3 non-recreation special use permits, 3 ditch easement applications, and intermittent short-term use by Outfitter and guides. The non-recreational permits and easement applications consist of a powerline, buried telephone cable and ditches. For the majority of the planning area, the proposed access plan won't affect these permits.

Road system changes have the potential to adversely affect access to permitted facilities. Certain access points must be provided for maintenance and management activities to the utilities and ditches. Proposed closures of access roads with barricades and gates will not eliminate access altogether, but will restrict access by requiring road closure permits, and increase costs incurred by the permittee's by having to remove and replace barricades.

There is an existing communication site located on top of Dixie Butte that is accessed by Forest Road 2610. The Forest Service, other governmental agencies, and private organizations use this communication site. This road is currently in very poor condition, and if improvements to the road surface and drainage were made, it would reduce adverse road impacts as well as greatly improve administrative access to the communication site and lookout.

This analysis area can contain two or more recreation temporary special use permits, which are recurring short-term permits, typically about 10 days in duration for any single year. The recreational permits are for outfitter guide operations. While the existing road system is helpful in dispersing hunters in the analysis area, the recommended changes are not expected to significantly these permits.

GENERAL PUBLIC TRANSPORTATION

GT1: How does the road system connect to public roads and provide primary access to communities?

There are few tie-through roads in the area that are used for other than local Forest access in the area. So the roads that provide primary access to and between area communities are limited to County roads or State and Federal Highways.

Virtually all of the local roads connect to County roads or State and Federal Highways, either directly or via Forest collector and arterial roads.

GT2: How does the road system connect large blocks of land in other ownership to public roads? (ad-hoc communities, subdivisions, inholdings, and so on)

The majority of other ownership lands within and adjacent to the project area are accessed by utilizing United State Highways 7 and 26, County Road 20, along with Forest system roads tied into these public transportation systems. The current access management plan is not expected to adversely impact access to non-Federal lands, however, coordination with these owners is recommended to avoid potential conflicts. Known Forest system roads used by these other owners are listed below.

Roads 2010 and 2010292 are currently open and provide access to a small within holding on Vincent Creek.

Roads 2010 and 2010148 provide access to the Umatilla National Forest and to scattered patented mining claims (private lands) within the Vinegar Hill – Indian Rock Scenic Area. Road 2010 is open, while road 2010148 is closed to motorized vehicles without a permit.

Road 4550 and 4550018 provide access to private lands commonly known as the Oxbow Ranch. Road 4550 is an open road, while road 4550018 is open to the public only on those portions of the road that are located on National Forest System lands. No current public right-of-way exists for the segments of this road that are located on private lands, which includes almost the entire segment of the road between Granite Boulder Creek west to the end of the road where it joins Grant County Road 20. This portion of the road was known as the County Road 20 bypass, and was used for commercial hauling until the new bridge on County Road 20 was recently installed. The Forest has the ability to access an isolated piece of road 4550018 and National Forest System (NFS) lands in the Beaver Creek area via its own transportation system using roads that are currently closed that tie in with road 4555. Conversely, the Oxbow Ranch uses road 4550018 across Beaver Creek as a private road during management activities associated with the ranch. Long term transportation plans and authorizing documents need to be developed in this area addressing future Forest Service and private access needs.

Road 4550999 is used by the Oxbow Ranch to access and maintain irrigation ditches; this road is recommended for closure, with a gate on the portion of road that provides access to the ditches.

Roads 2610 and 2614 are open roads and provide access to private lands in the Bridge Creek/Placer Gulch area.

Road 2612 is open and provides access to private lands in the North Fork Bridge Creek area.

GT3: How does the road system affect managing roads with shared ownership or with limited jurisdiction? (RS2477, cost-share, prescriptive rights, FLPMA easements, FRTA easements, DOT easements)?

Proposed management activities are not expected to change present use. Within the project area, the only USDA easement grant is for County Road 20 along the Middle Fork of the John Day River, which has a variable width right-of-way. At this time there are no RS2477 claims, or cost-share roads. However, there are potential RS2744 or prescriptive right claims within the project area, especially on road 2010148, which provides access to patented mining claims (private lands) within the Vinegar Hill - Indian Rock Scenic Area. This same road also provides access to southern portion of the scenic area on the Umatilla National Forest.

GT4: How does the road system address the safety of road users?

While use of Forest Roads for logging activities has declined significantly, the Forest has been experiencing significant increases in overall recreational use. Traffic conflicts are expected to rise with future increases in population, tourist visits, and recreational use in the analysis area, and also because as open road densities are reduced through road closures and decommissioning, more users will use fewer miles of road.

Road Condition Assessment surveys, conducted in recent years revealed substantial deferred maintenance work items related to health and safety, some of which are considered critical. Critical safety deferred maintenance work items include: aggregate placement, turnout construction/reconstruction, brushing and clearing for sight distance and signing.

As much as current road maintenance funding levels allow, the classified roads in the analysis area are maintained and signed in accordance with their maintenance level and traffic service level. Additional reconstruction and maintenance work may be required to accommodate increased traffic use on roads that are to be left open.

ADMINISTRATIVE USE

AU1: How does the road system affect access needed for research, inventory, and monitoring?

To date the existing road system has been adequate for research, inventory, and monitoring needs.

AU2: How does the road system affect investigative or enforcement activities?

All of the open and gated roads in the analysis area provide vehicular access for both investigative and enforcement activities. The most prevalent recreation-related activities needing patrol are hunting related activities and summer/fall illegal use of motorized vehicles off roads. While the roads provide access for these activities, they also provide access for law enforcement personnel to conduct preventative and enforcement patrols.

PROTECTION

PT1: How does the road system affect fuels management?

About one third the analysis area is not accessible for fuels management activities due to lack of roads. A small part of the inaccessible area contains a fire regime defined as having infrequent fires of high intensities (spruce-fir and sub-alpine fir types) where there are no plans to manage fuels. The rest of the inaccessible area generally has dense stocking and high fuel loadings and is in need of fuels treatments.

The area south of the Middle Fork has a large portion with native surface roads that are narrow and deeply rutted. Many of these roads are not safely drivable making it dangerous to conduct prescribed burning for much of that area. Mechanical treatment of fuels involving removing excess fuels either by timber sales or service contracts is also limited in the areas with poor road conditions. The rest of the road system in the area is adequate to conduct fuels reduction projects.

PT2: How does the road system affect risk to fire fighters and to public safety?

The area south of the Middle Fork from Dixie Butte to Austin Junction has roads that are not passable for most vehicles (jeep roads) and much of this area also has few "safety zones" for firefighters to escape to in an emergency situation, as there are few openings in the dense forest canopies. Firefighters would need to hike long distances to reach safety zones in the event of a fast moving wildfire. This increases the risk of entrapment when performing fire suppression or prescribed fire activities in this area. Fires that escape initial attack in this area would threaten Austin House, homes on the north and east sides of the area and travelers on Highway 26, Highway 7 and County Road 20 because there are limited opportunities to defend against wildfires until these roads are reached.

Road 2010 is a major access point to the Indian Rock – Vinegar Hill Scenic area. The last three miles of this are very narrow with few turnouts and few opportunities to pass other vehicles. When meeting another vehicle, one of them often has to back a long way to find a place to pass. This creates a dangerous situation for fire fighters attempting to respond to a fire and the public that would be attempting to evacuate the area.

Most of the road systems in the analysis area start along County Road 20 and dead end at the upper elevations. Fires that start in the lower elevations can trap fire fighters or the public that happen to be on roads that are adjacent to or crossed by wildfires below them. The last three miles of Road 2010 is particularly vulnerable to being crossed by a wild fire because it traverses the upper part of steep mountainous terrain.

PT3: How does the road system affect the capacity of the Forest Service and cooperators to suppress wildfires?

The road system provides relatively rapid access for ground based fire suppression forces to manage wildfires for about two thirds of the area. Most of the roads can be utilized as fire breaks due to locations and fuel types present.

The areas with no roads, or those areas with narrow roads not passable for most types of vehicles, can be staffed with smoke jumpers or helitack crews, provided they are available and use of helicopters and airplanes can be utilized to drop water or retardant. However, if extended attack is needed or if project fires are in these areas, it is difficult to staff the fires or to bring in equipment. The result is a reduced capacity to suppress the fires and larger fires may be the result.

PT4: How does the road system contribute to airborne dust emissions resulting in reduced visibility and human health concerns?

This is not an issue except for short periods in local areas where management activities are taking place. Management activities design criteria insure that dust abatement is included for those activity areas when deemed necessary.

UNROADED RECREATION

UR1: Is there now or will there be in the future excess supply or excess demand for unroaded recreation opportunities?

The unroaded areas will continue to provide opportunities for solitude and outdoor recreation. This larger-scale question is addressed in the LRMP for the Forest.

UR2: Is developing new roads into unroaded areas, decommissioning of existing roads, or changing the maintenance of existing roads causing substantial changes in the quantity, quality, or type of unroaded recreation opportunities?

Several system and non-system roads and "jeep trails" in the analysis area have been closed under the LRMP. This resulted in an increase in both the quantity and quality of opportunities available for unroaded recreation within the analysis area. Long-term projections for road densities on the Forest in general are expected to continue to decrease, which should also increase the quantity and quality of unroaded opportunities.

UR3: What are the adverse effects of noise and other disturbances caused by developing, using, and maintaining roads, on the quantity, quality, and type of unroaded recreation opportunities?

This is not considered a significant issue within the analysis area. Potential effects include increased sights and sounds of people, and equipment adjacent to portions of the planning area. The vegetation and topography in the analysis area is such that summertime recreationists in unroaded areas are usually not within the road system's noise and disturbance zone of influence.

UR4: Who participates in unroaded recreation in the areas affected by constructing, maintaining, and decommissioning roads?

Although snowmobile recreation occurs, hunters and ATV use comprise the largest segment of the unroaded recreationists in the analysis area. Essentially all of the hunters, snowmobilers, and ATV users utilize motor vehicles to gain access to the area and then pursue their activity in the unroaded environment.

UR5: What are these participants' attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?

People that are seeking remoteness and solitude use the area. There are numerous alternative locations for summer unroaded activities within a reasonable distance from the analysis area. Nearby, the Strawberry Mountain Wilderness and off Forest on the Umatilla National Forest the North Fork John Day Wilderness.

ROADED RECREATION

RR1: Is there now or will there be in the future excess supply or excess demand for roaded recreation opportunities?

This question is beyond the scope of this road analysis; the larger-scale question is addressed in the LRMP for the Forest. However, two-thirds of the planning area is relatively heavily roaded currently. And it can reasonably be expected that as human populations increase and as recreational technologies advance, there will be an associated increase in demand for road-related recreation activities.

Off-highway vehicles (OHV) such as motorcycles and All Terrain Vehicles (ATVs) are increasing in popularity and the demand for open roads and trails that restrict full-sized motor vehicles has increased in recent years. As development and congestion continues in more heavily populated areas, the planning area will see increased use from those who are seeking a more secluded environment. As public demand for fast and efficient access to the forest environment increases, the road system will become increasingly important to provide that access.

RR2: Is developing new roads into unroaded areas, decommissioning of existing roads, or changing maintenance of existing roads causing substantial changes in the quantity, quality, or type of roaded recreation opportunities?

As with recreation sites, the maintenance of a viable road system is a key to providing the diverse recreation opportunities available on the Forest. In addition to dispersed camping opportunities, the analysis area also has two developed campgrounds (Middle Fork Campground and Deerhorn Campground), and several trailheads. Some existing trails and trailheads have adequate road access, but access to others is only marginal or in some cases currently inadequate to meet the demand.

There are no current proposals to build new roads into roadless areas identified in Appendix C of the Malheur LRMP. Current direction is that most new road constructed for primarily for harvest activities will not be left open to the public. These roads may be available on a permit only basis if needed. In most areas it will be necessary to reduce both total road densities and open road densities, in order to meet LRMP goals, protect resources from road related impacts, and reduce maintenance costs.

Foreseeable changes in the Access and Travel Management plan for the Southeast Galena analysis area are not expected to cause substantial changes in the quality or type of roaded recreation opportunities. They will however result in a reduction of the number of road miles open to these types of activities. This will result in concentrating greater numbers of users on fewer miles of open roads, which could have some undesirable effects on the quality of recreational experience, and cause some overuse in these areas. As more users are concentrated on fewer miles of open roads, having safe, well-maintained roads will become more critical.

The main recreation access concerns are related to certain areas with very limited motorized access, and in some cases loop-type or tie-through roads. Closing of road segments in a manner that effectively eliminates tie-through or loop- type access will almost always be controversial. Road system changes have the potential to adversely affect access to some popular areas.

RR3: What are the adverse effects of noise and other disturbances caused by constructing, using, and maintaining roads on the quantity, quality, or type of roaded recreation opportunities?

This is not considered a significant issue within the analysis area. It can be reasonably expected that road recreationists will experience temporary disturbance and inconvenience in terms of short duration travel delays, dusty road conditions, and the need to drive more carefully due to increased encounters with road construction and maintenance machinery. Non-motorized road users such as mountain bicyclists may experience the highest level of adverse effects due to dust and fumes from machinery.

RR4: Who participates in roaded recreation in the areas affected by road constructing, changes in road maintenance, or road decommissioning?

The most significant use is by hunters during the big game seasons, with the heaviest use occurring from August through November. Other users include recreational drivers, dispersed campers, firewood and other miscellaneous special forest product gatherers, ATV and horn gathering drivers. Snowmobile riders and cross-country skiers use the area during the winter season, particularly the two designated snowmobile trails, including the Vincent Snowmobile Trail-256, and Bridge Creek Snowmobile Trail-256. All Terrain Vehicles use occurs on the Davis Creek Trail-244.

RR5: What are these participants' attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?

Much of the attachment to the roaded portion of the analysis area is because of familiarity with the area and from the quick and easy access from County Road 20 and U.S. Highway 26. The part of the analysis area has had extensive road access for many decades and generations of families have recreated there. Due to the secluded feeling that the area gives, it creates a strong emotional and psychological bond, which gives people a very strong affinity for the area.

County Road 20 is a high standard, double-lane paved road that runs right through the middle of the analysis area. While there are many alternative locations on the Malheur National Forest that have a similar range of recreational opportunities, not many that have such quick and easy access available on such a high-standard road. This is probably one of the primary reasons the analysis area is so popular with recreationists.

PASSIVE-USE VALUE

PV1: Do areas planned for road construction, closure, or decommissioning have unique physical or biological characteristics, such as unique natural features and threatened or endangered species?

While no unique physical or biological characteristics, or unique natural features have been identified within the planning area, it does provide potential habitat for several T&E listed species including Mid-Columbia River summer-run steelhead, Columbia River Basin bull trout, Canada lynx, gray wolf and bald eagle.

PV2: Do areas planned for road construction, closure, or decommissioning have unique cultural, traditional, symbolic, sacred, spiritual, or religious significance?

At this time, there are no known areas of cultural, traditional, symbolic, sacred, spiritual, or religious significance in the Southeast Galena planning area. Consultation and communication with the Confederated Tribes of the Warm Springs Indian Reservation (CTWSR), the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and the Burns Paiute Indian Tribe has not resulted in the identification of any such areas. Cultural resource inventories, which have covered approximately 60% of the planning area, have likewise failed to identify places that may be associated with important cultural practices of a contemporary community.

PV3: What, if any, groups of people (ethnic groups, subcultures, and so on) hold cultural, symbolic, spiritual, traditional, or religious values for areas planned for road entry or road closure?

American Indian groups or bands from the Great Basin and Columbia Plateau used the Southeast Galena planning area during historic and ethnographic periods. The Umatilla, Cayuse, Walla Walla, Tenino, and Paiute people all historically foraged in the Middle Fork of the John Day River on a seasonal basis (Suphan 1974; Blyth 1938; Stewart 1939). The study conducted by Suphan (1974), identified an ethnographic Umatilla/Cayuse/Tenino hunting and fishing camp near the mouth of Granite Boulder Creek known as “Pe-sown-e-a”. In 1832, Hudson’s Bay Company trapper John Work reported an encounter with several families of “Mountain Snakes” on the Middle Fork of the John Day River (Suphan 1974). Paiute Indians were commonly referred to as “Snakes” or “Diggers by Europeans and Euroamericans throughout the 19th century although the ethnic affiliation of these people is unknown. In 1864, European, Asian, and Euro-American miners rushed into the planning area and industrial scale mining continued intermittently for the subsequent 80 years. Chinese placer mine operators inhabited an area in Davis Creek known as “Happy Camp” in the latter years of the 19th century (Oregon DOGMI 1941).

Presently, the planning area is within territories ceded to the United States by the bands of the Warm Springs Indian Reservation in 1855. The Southeast Galena planning area is also considered a “traditional use” area by bands of the Umatilla Indian Reservation and the Burns Paiute. Government-to-government consultation with these federally recognized tribes has not resulted in the identification of any localities in the planning area that hold spiritual or religious value with the tribes. No other groups or individuals have informed the Forest Service that the planning area may be important for religious or spiritual practices.

PV4: Will constructing, closing, or decommissioning roads substantially affect passive-use values?

Road system changes will affect different passive use values to varying degrees. For example, building additional roads or increasing motorized use will favor those forest users seeking motorized recreation; while closing roads and road obliteration will favor those forest users seeking a non-motorized experience.

People generally do assign “passive use=value to natural resources, especially roadless areas” and other natural areas or areas with unique characteristics. Building roads into such areas may reduce passive-use values or may serve values that require roaded access. Conversely, decommissioning roads may also increase or decrease passive-use values depending on the environmental effects of the activities. Although extensive scientific studies and information exists on passive-use and other non-market values, there is little evidence on quantifying the relationship among roads, roadless landscapes, and passive-use values. Several studies conclude that people assign passive-use values to roadless areas in very specific places (USDA 2001). Determining the parameters that apply to specific decisions would require further studies.

SOCIAL ISSUES

SI1: What are people's perceived needs and values for roads? How does road management affect people's dependence on, need for, and desire for roads?

This larger-scale question is addressed in the LRMP for the Forest (Also see PV2-PV4, SI 12-14, SI8, and SI10).

SI2: What are people's perceived needs and values for access? How does road management affect people's dependence on, need for, and desire for access?

As a result of publicity generated by opponents and supporters of the past ATM planning and implementation, there is a heightened awareness on the issues of motor vehicle access on the Forest. Snowmobilers, 4WD enthusiasts, and ATV riders are strongly opposed to any loss of motorized access. Two thirds of the analysis area has historically had ample motorized access, while the remaining third of the area is essentially roadless. Any proposals to close or decommission large portions of the road system will be met with both strong support and strong opposition.

SI3: How does the road system affect access to paleontological, archaeological, and historic sites?

Cultural resource management activities of the past 20 years in addition to the inventory conducted in support of the Southeast Galena project have resulted in the survey of approximately 60% of the planning area and identification of 70 cultural resource properties that are potentially eligible for the National Register of Historic Places (NRHP).

There have not been any paleontological inventories completed in the planning area.

Access has not been identified as detrimental to the archaeological record in the planning area. It is not anticipated that road management in the planning area will impact any identified significant cultural resource properties in any manner. All significant properties will most likely be avoided by road construction or reconstruction activities. If avoidance is not practical, it will be necessary to resolve adverse effects on a significant historic property in consultation with the Oregon SHPO (State Historic Preservation Officer) and the Federal ACHP (Advisory Council on Historic Preservation).

SI4: How does the road system affect cultural and traditional uses (such as plant gathering, and access to traditional and cultural sites) and American Indian treaty rights?

The Southeast Galena Analysis Area is within territories ceded to the United States by the bands of the Warm Springs Indian Reservation in 1855. The area is also considered a "traditional use" area by bands of the Umatilla Indian Reservation and the Burns Paiutes. Government-to-government consultation with these federally recognized tribes has not resulted in the identification of any localities in the planning area that hold spiritual or religious value with the tribes. No other groups or individuals have informed the Forest Service that the planning area may be important for religious or spiritual practices.

However, access and travel management within the planning area could potentially affect the ability of Indian tribes to access traditional use areas or exercise treaty-reserved rights. In general, all of the Columbia Basin tribes hold treaty-reserved rights to access "usual and accustomed fishing grounds and stations", as well as areas traditionally used for hunting and gathering of edible plants. The tribes have expressed concerns related to access and traditional use areas during previous roads analyses conducted on the Malheur National Forest. Access and travel planning should be done in consultation with the Confederated Tribes of the Warm Springs Indian Reservation (CTWSR), the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), and the Burns Paiute Indian Reservation.

SI5: How does road management effect historic sites?

The Southeast Galena Analysis Area contains a portion of the Sumpter Valley Railway (SVRy) system, which was added to the National Register of Historic Places in 1987. Approximately 20 miles of the SVRy narrow gauge system are within the boundaries of the planning area; the vast majority of which have been converted to Forest Service roads. Generally speaking, the segment of railway within the Southeast Galena Analysis Area does not retain sufficient integrity to contribute to the overall significance of the system. All sections of railroad grade in the Southeast Galena planning area may be recommended for reconstruction or decommissioning during the analysis.

SI6: How does road management affect community social and economic health (for example, lifestyles, businesses, tourism industry, infrastructure maintenance)?

This larger-scale question is addressed in the Malheur National Forest LRMP.

SI7: What is the perceived social and economic dependency of a community on an unroaded area versus the value of that unroaded area for its intrinsic existence and symbolic values.

This larger-scale question is addressed in the Malheur National Forest LRMP.

SI8: How does road management affect wilderness attributes, including natural integrity, natural appearance, opportunities for solitude, and opportunities for primitive recreation?

None, as there are no wilderness attributes inside or adjacent to the analysis area.

SI9: What are traditional uses of animal and plant species in the area of the analysis?

Species of fauna which were used by tribes or bands of American Indians that foraged in the analysis area prior to Euro American contact include: mule deer, Rocky Mountain elk, and anadromous fish. Traditionally important plant species that occur within the analysis area include species of: biscuitroot, bitterroot, onion, and huckleberry.

SI10: How does road management affect people's sense of place?

In the Dixie Butte and Greenhorn Roadless Areas, the emphasis is to have these areas function as biological strongholds for populations of threatened and endangered species as well as provide large, relatively undisturbed areas for wildlife dependent on this character. Benefiting uses include opportunities for dispersed non-motorized outdoor recreation.

Outside of the roadless areas, road management is the backbone of much of this area's traditional "sense of place". Ties to the land are based on the lifestyles of people that make their living off of the land. These parts of the analysis area are dedicated to multiple uses of resources, including timber harvesting, grazing, and mineral extraction.

Hunting is another use associated with the land that impacts the "sense of place" for many users. The existing road management benefits the majority of recreationists in the area, especially those seeking a motorized recreation type of experience. Since most of the area is very roaded, it provides a roaded "sense of place" for timber, range, and recreation users. As more roads are closed, it will upset many of the traditional users. Wilderness users would support road closures, but most wilderness users go elsewhere for a wilderness experience or an "unroaded sense of place", and probably do not have a history of use in this area.

Sense of place in the Southeast Galena area is provided, in part, by elements of the cultural environment that connects visitors with history of railroad logging in the Blue Mountains. People who grew up in Bates or the local area like to travel the area. Older residents of the local towns like to be able to go to areas they used when they were living in the area.

There are areas that have local sentimental value or significance, because people have traditionally recreated there, lived nearby, have had family gatherings in these areas, or because people are particularly interested in local history. The old Bates Mill town-site and pond are located just west of the junction of County 20 with OR State Hwy. 7. There are people in the local area who used to live there or whose relatives worked there.

CIVIL RIGHTS AND ENVIRONMENTAL JUSTICE

CR1: How does the road system, or its management, affect certain groups of people (minority, ethnic, cultural, racial, disabled, and low income groups)?

Although the road system and its management does not provide many accommodations specifically for disabled people, the roads in the Southeast Galena analysis area are being used by all groups of people (including minority, ethnic, cultural, racial, disabled, or low-income). To the best of our knowledge, the current road system and its management are not adversely impacting the civil rights of any group.

If the recommendations from this analysis are implemented, it will result in overall improvements to roads that remain on the Forest transportation system, and decreases in both total and open road miles over the long-term. Varying impacts would occur to disabled people, low-income groups that require motorized access to participate in recreational activities such as hunting, dispersed camping, firewood gathering, or collection of non-timber forest products. Impacts would also include easier access to some areas that are inaccessible or difficult to access. This creates opportunities for disabled and others that currently are restricted due to existing conditions of the transportation system.

APPENDIX A – Roads Glossary *[see next page]*

Road – **A motor vehicle travelway over 50 inches wide, unless designated and managed as a trail. A road may be classified, unclassified, or temporary.**

(1) *Classified road.* A road wholly or partially within or adjacent to National Forest System lands that is determined to be needed for long-term motor vehicle access, including State roads, County roads, privately owned roads, National Forest System roads, and other roads authorized by the Forest Service. If a system road is no longer necessary for long-term resource management it is considered a candidate for decommissioning.

(2) *Unclassified Road.* A road on National Forest System lands that is not managed as part of the forest transportation system, such as unplanned roads, abandoned travelways, and off-road vehicle tracks that have not been designated and managed as a trail; and those roads that were once under permit or other authorization and were not decommissioned upon the termination of the authorization.

(3) ***Temporary Road.* A road authorized by contract, permit, lease, other written authorization, or emergency operation, not intended to be part of the forest transportation system and not necessary for long-term resource management.**

Decommissioned Roads – *Roads that are considered permanently removed from service and the Forest Transportation System, either because there is no reasonably foreseeable need for the road, or because its continued use is not compatible with other resource protection needs, or both. The goal is to leave them in a condition that will not require custodial maintenance. All stream crossing structures are removed and the stream crossing areas are reshaped to resemble a natural condition. All culverts, roadside ditches, and ruts are removed. The road surface is shaped so that no segments provide a continuous surface flow path to a stream channel. This is typically accomplished by outsloping the road surface, constructing frequent cross ditches, or a combination of both. Revegetation of decommissioned roads can occur naturally or may be accomplished by other methods to get cover within ten years after the last activity, as required by the National Forest Management Act.*

Obliterated Roads – *are a type of decommissioned roads, on which the restoration work includes pulling back the fill materials and reshaping the roadway to restore natural contours.*

Closed Roads – *are roads on which motorized traffic has been excluded by regulation, barricade blockage, or by obscuring the entrance. A closed road remains on the Forest Road Transportation System, and is still an operating facility, but one on which motorized traffic has been removed (year-long or seasonal). Closed roads are expected to be needed on an occasional or intermittent basis, and require periodic monitoring and basic custodial maintenance.*

Inactivated Road – *are a class of closed roads where a management decision has determined the road is not needed for an interval of at least ten years. Motorized traffic is excluded for an indefinite period of time by regulation, barricade blockage, or by* *obscuring the entrance. All stream crossing structures are removed, and the stream crossing areas are reshaped to resemble a natural condition. All culverts, roadside ditches, and ruts are removed. The road surface is shaped so that no segments provide a continuous surface flow path to a stream channel. This is typically accomplished by out sloping the road surface, constructing frequent cross ditches, or a combination of both. An inactivated road remains on the Forest Road Transportation System, but is left in a condition where basic custodial maintenance is not necessary. If a later decision determines the road should be decommissioned, no additional work would usually be needed.*

***Open Road** – A road, or segment thereof, that is open to the general public without restrictions other than general traffic control or restrictions based on size, weight, or class of vehicle. An otherwise open road may be closed during scheduled periods, extreme weather conditions, or emergencies.*

***Road construction*. Activity that results in the addition of forest classified road miles or temporary road miles.**

***Road maintenance*. The ongoing upkeep of a road necessary to retain or restore the road to the approved road management objective**.

***Road reconstruction*. Activity that results in improvement or realignment of an existing classified road defined as follows;**

(1) Road improvement. Activity that results in an increase of an existing road's traffic service level, expansion of its capacity, or a change in its original design function.

(2) Road realignment. Activity that results in a new location of an existing road or portions of an existing road, and treatment of the old roadway.

APPENDIX B – ROAD TABLES

The tables in this appendix display the existing status and recommended future status of each road segment in the analysis area. The Key for the tables is as follows:

EX_CONDITION = Existing Condition; All existing roads are shown as being in one of the three following categories:

O = Open

C = Closed

D = Decommissioned

FUTURE_CONDITION = Recommended Future Condition;

EO = Existing Open (An currently open road segment that is recommended to remain open);

NO = New Open (A proposed new construct road that is recommended to be left open or a currently closed road is recommended to changed to open status);

EC = Existing Closed (A currently closed road that is recommended to remain closed);

NC = New Closure (A proposed new construct road that is recommended to be left closed or an existing open road that is recommended to be changed to a closed status);

ED = Existing Decommission (An existing decommissioned road that is recommended to remain decommissioned);

ND = New Decommission (An existing open or closed road that is recommended to be decommissioned);

SC = Seasonal Closure [An existing open or closed road is recommended to change to a seasonally closed status (December through March)]

The first two lines on the first page of the tables are the cumulative mileages for all of the recommended new road construction (hence no road numbers), and their proposed future status (New Open or New Closed). These mileage numbers do not include the three roads that were previously decommissioned that this road analysis recommends be placed back on the Forest road system as classified roads. Those roads are listed individually as roads 2010311, 2010430, and 2010771.

APPENDIX G--Appendix B --SE GALENA EXISTING ROUTE STATUS
(ONLY ROADS WITHIN PROJECT BOUNDARY)
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ID	EX_CONDITION	FUTURE_CONDITION	LENGTH
	New Construct	NC	13.35
	New Construct	NO	3.28
2000020	C	ND	1.11
2000020	C	NO	2.05
2000024	C	ND	0.17
2000025	O	EO	0.33
2000026	D	ED	0.27
2000027	D	ED	0.2
2000042	C	ND	0.23
2000048	C	NO	1.03
2000058	C	NO	0.12
2000078	C	ND	0.05
2000080	C	ND	0.21
2000120	D	ED	1.09
2000120	O	EO	5.47
2000121	O	EO	0.14
2000131	O	EO	0.22
2000136	O	EO	0.15
2000139	C	ND	1.42
2000139	C	NO	0.17
2000380	C	ND	0.31
2000380	O	NC	0.27
2000542	O	EO	0.45
2000542	O	ND	0.12
2000563	O	EO	0.21
2000612	D	ED	0.74
2000629	C	ND	0.62
2000646	D	ED	0.45
2000647	D	ED	0.2
2000663	O	EO	0.11
2000680	O	EO	1.83
2000681	D	ED	0.14
2010000	O	EO	13.53
2010013	D	ED	0.41
2010015	C	EC	0.84
2010021	D	ED	0.24
2010028	D	ED	0.29
2010029	D	ED	0.16
2010035	O	EO	0.57
2010035	O	ND	0.21
2010036	O	ND	0.38
2010045	D	ED	1.24
2010046	C	EC	0.13
2010047	D	ED	0.26
2010067	D	ED	0.77
2010072	C	NO	1.26
2010072	O	EO	0.86
2010073	C	EC	0.75
2010101	O	ND	0.18

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ID	EX_CONDITION	FUTURE_CONDITION	LENGTH
2010108	D	ED	0.83
2010125	D	ED	0.26
2010142	D	ED	0.22
2010148	C	EC	1.5
2010158	C	EC	0.55
2010159	C	EC	1.58
2010159	C	ND	0.04
2010160	C	ND	0.75
2010161	C	ND	1.24
2010168	D	ED	0.04
2010184	D	ED	1.49
2010184	O	EO	0.53
2010188	C	EC	0.09
2010198	D	ED	0.19
2010204	D	ED	0.35
2010214	C	ND	0.61
2010219	O	ND	0.27
2010243	C	ND	0.58
2010260	D	ED	0.47
2010260	O	EO	0.31
2010261	O	EO	0.08
2010277	C	EC	0.12
2010292	C	ND	0.42
2010292	O	EO	0.64
2010292	O	ND	0.28
2010294	C	EC	0.32
2010294	C	ND	0.63
2010311	C	EC	0.36
2010311	D	NC	1.01
2010328	C	EC	2.01
2010329	D	ED	0.13
2010345	C	EC	1.8
2010346	D	ED	0.39
2010362	C	EC	0.79
2010370	D	ED	0.31
2010376	C	EC	0.39
2010376	C	ND	1.18
2010377	C	ND	0.38
2010379	D	ED	1.26
2010396	C	ND	0.44
2010396	O	ND	0.29
2010429	O	ND	0.21
2010430	D	ED	0.46
2010430	D	NC	0.44
2010432	C	EC	1.06
2010434	C	ND	0.11
2010482	D	ED	0.31
2010499	C	ND	0.25
2010499	O	ND	0.03
2010533	C	ND	0.35
2010533	D	ED	0.79

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ID	EX_CONDITION	FUTURE_CONDITION	LENGTH
2010534	C	ND	0.08
2010544	C	EC	0.13
2010545	C	NO	0.82
2010547	O	EO	0.1
2010549	D	ED	0.13
2010567	C	EC	0.32
2010567	C	ND	0.19
2010584	C	EC	0.15
2010584	C	ND	0.33
2010601	C	EC	0.22
2010601	C	ND	0.19
2010618	O	EO	5.78
2010630	C	EC	0.27
2010631	C	EC	1.52
2010631	C	ND	1.26
2010632	C	EC	0.76
2010632	C	ND	0.24
2010633	C	ND	0.36
2010634	D	ED	0.32
2010635	D	ED	0.56
2010636	D	ED	0.11
2010669	C	EC	0.26
2010686	D	ED	0.31
2010687	D	ED	0.08
2010689	D	ED	0.09
2010691	C	EC	0.08
2010703	C	EC	1.79
2010704	D	ED	0.45
2010720	D	ED	0.29
2010737	O	EO	0.36
2010738	O	ND	0.3
2010771	D	NC	0.75
2010805	C	ND	0.45
2010807	C	ND	1.89
2010807	O	EO	0.19
2010824	D	ED	0.2
2010839	C	EC	0.39
2010873	O	EO	1.55
2010874	O	EO	0.12
2010874	O	ND	0
2010890	O	ND	0.41
2010891	O	ND	0.3
2010907	D	ED	0.51
2010924	C	EC	0.43
2010940	C	ND	0.08
2010940	C	NO	0.18
2010941	C	EC	0.8
2010941	C	ND	0.34
2010942	D	ED	0.19
2010949	C	EC	0.5
2010949	C	ND	1

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ID	EX_CONDITION	FUTURE_CONDITION	LENGTH
2010950	C	EC	0.28
2010958	C	ND	0.32
2010958	O	EO	0.18
2010959	C	EC	0.35
2010959	C	ND	0.13
2010960	O	EO	0.07
2010966	D	ED	0.29
2010966	O	EO	0.13
2010969	D	ED	0.17
2010976	C	ND	0.4
2010979	C	EC	0.39
2010980	C	EC	1.97
2010983	C	EC	0.15
2010984	C	EC	0.55
2010984	C	ND	0.12
2010985	C	EC	0.55
2010986	C	EC	1.94
2010986	C	NO	0.15
2010987	C	NO	0.21
2010988	D	ED	0.2
2010989	D	ED	0.26
2010991	D	ED	0.57
2010992	C	NO	0.03
2010992	D	ED	0.18
2010992	O	EO	0.06
2010993	O	EO	1.72
2010998	C	EC	0.51
2010998	C	ND	0.2
2010999	C	ND	0.24
2050000	O	EO	0.63
2050032	C	EC	1.23
2050032	C	NO	1.53
2050033	C	EC	0.46
2050034	C	ND	0.88
2050035	C	ND	0.21
2050035	O	EO	1.34
2050037	C	EC	0.5
2050038	C	EC	1.89
2050040	C	EC	0.57
2050068	C	ND	0.1
2050072	O	EO	0.97
2050072	O	NC	1.48
2050073	C	ND	0.41
2050074	C	ND	0.17
2050130	C	EC	0.28
2050201	C	EC	0.84
2050282	C	EC	0.24
2050302	C	EC	0.53
2050504	O	ND	0.11
2050648	D	ED	0.83
2050666	C	NO	0.08

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ID	EX_CONDITION	FUTURE_CONDITION	LENGTH
2050790	D	ED	0.1
2050791	C	EC	2.82
2050791	C	ND	1.65
2050792	D	ED	0.18
2050793	D	ED	0.1
2050808	D	ED	1.34
2050809	O	NC	0.21
2050825	C	EC	1.28
2050825	O	NC	0.44
2050826	C	EC	0.13
2050830	D	ED	0.74
2050831	D	ED	0.22
2050842	C	ND	0.22
2050843	C	ND	0.24
2050859	C	NO	0.32
2050876	C	ND	0.25
2050910	C	ND	0.17
2050924	C	ND	0.2
2050925	C	ND	0.15
2050926	C	EC	0.1
2050927	C	EC	0.57
2050927	C	ND	1.69
2050928	C	ND	0.66
2050929	D	ED	0.11
2050930	D	ED	0.38
2055000	O	EO	7.43
2055091	D	ED	1.27
2055106	O	NC	0.72
2055110	O	NC	0.02
2055110	O	ND	0.29
2055127	O	NC	0.38
2055161	C	EC	0.52
2055195	D	ED	0.12
2055278	D	ED	0.15
2055279	C	EC	4.22
2055280	C	EC	0.42
2055296	D	ED	0.06
2055330	C	EC	0.57
2055342	C	ND	0.57
2055343	C	EC	0.57
2055345	C	EC	0.86
2055347	D	ED	0.3
2055348	C	ND	0.33
2055364	C	EC	3.65
2055364	C	ND	0.1
2055364	O	NC	0.51
2055364	O	ND	0.3
2055365	C	EC	0.37
2055366	C	EC	0.53
2055367	C	EC	0.08
2055398	O	NC	1.12

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ID	EX_CONDITION	FUTURE_CONDITION	LENGTH
2055415	C	EC	0.62
2055432	D	ED	1.92
2055450	D	ED	1.14
2055452	C	EC	0.71
2055467	C	ND	0.45
2055479	C	ND	0.32
2055479	D	ED	0.85
2055484	C	EC	0.22
2055501	C	EC	0.37
2055518	C	EC	0.78
2055518	C	ND	0.33
2055531	C	ND	0.11
2055531	O	ND	1.1
2055532	C	EC	0.55
2055566	D	ED	0.22
2610000	O	EO	1.87
2610275	O	EO	0.04
2610365	O	ND	0.05
2610502	C	ND	0.06
2610574	C	EC	0.17
2610574	O	NC	0.07
2610575	O	ND	0.01
2610623	C	EC	0.25
2610623	O	EO	0.12
2610742	C	EC	0.44
2610759	O	EO	2.27
2610777	O	ND	0.38
2610779	O	ND	0.05
2610920	C	ND	0.06
2612000	O	EO	4.75
2612109	C	EC	1.33
2612114	D	ED	0.69
2612115	O	EO	0.05
2612123	D	ED	0.08
2612362	C	ND	0.03
2612483	C	EC	0.42
2612518	C	EC	0.15
2612518	C	NC	0.3
2612520	C	ND	0.13
2612569	C	ND	0.2
2612570	O	EO	3.09
2612571	C	EC	0.56
2612587	C	EC	2.2
2612588	C	ND	0.13
2612604	C	EC	0.74
2612604	C	ND	0.21
2612605	C	ND	0.18
2612621	C	ND	1.19
2612638	C	ND	0.13
2612639	C	ND	0.2
2612655	O	ND	0.75

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ID	EX_CONDITION	FUTURE_CONDITION	LENGTH
2612672	C	EC	0.9
2612673	D	ED	0.27
2612675	D	ED	0.28
2612688	C	ND	0.04
2612689	C	EC	0.13
2612692	O	NC	0.03
2612692	O	ND	0.08
2612706	C	EC	1.92
2612708	C	ND	0.87
2612710	D	ED	0.09
2612723	C	ND	0.57
2612740	O	NC	0.23
2612755	C	EC	0.32
2612755	C	ND	0.97
2612757	C	ND	0.09
2612774	D	ED	0.44
2612778	C	EC	0.42
2612878	C	EC	2.59
2612936	D	ED	0.43
2614000	O	EO	1.31
2614000	O	ND	1.48
2614033	O	EO	1.27
2614070	C	EC	1.63
2614107	O	ND	0.09
2614111	C	EC	0.24
2614128	C	EC	0.22
2614196	C	EC	0.38
2614229	D	ED	1.95
2614230	D	ED	0.22
2614232	D	ED	0.19
2614263	O	ND	0.71
2614314	O	ND	0.22
2614315	C	ND	0.16
2614316	C	ND	0.17
2614331	O	EO	3.15
2614331	O	NC	0.89
2614331	O	ND	2.27
2614332	O	NC	0.26
2614333	C	ND	0.37
2614334	C	ND	0.34
2614341	C	ND	0.09
2614348	O	ND	0.53
2614402	C	ND	1.34
2614402	O	EO	0.47
2614402	O	ND	0.49
2614403	C	ND	0.55
2614444	D	ED	0.65
2614445	D	ED	0.06
2614452	O	EO	1.89
2614453	O	NC	0.8
2614469	O	NC	1.17

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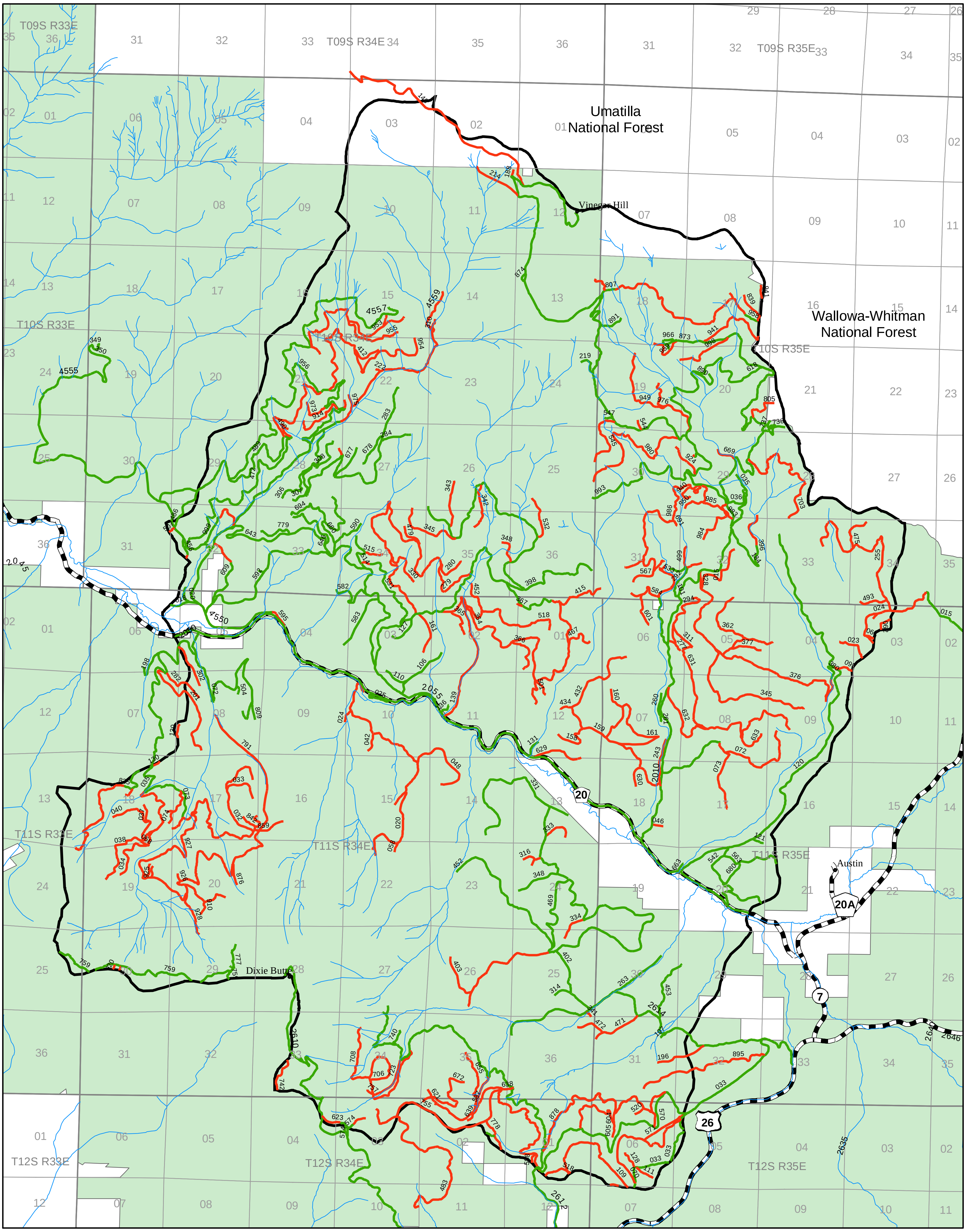
ID	EX_CONDITION	FUTURE_CONDITION	LENGTH
2614471	C	EC	0.6
2614472	C	EC	0.35
2614895	C	EC	0.41
2614895	C	ND	0.25
4550000	O	EO	2.74
4550018	O	EO	0.34
4550020	O	EO	0.21
4550191	D	ED	0.19
4550456	C	EC	0.04
4550456	O	NC	0.21
4550457	O	EO	0.04
4550472	C	ND	0.29
4550472	O	EO	0.12
4550472	O	NC	2.46
4550472	O	ND	0.03
4550486	O	EO	0.11
4550490	D	ED	0.11
4550507	C	EC	0.09
4550514	O	ND	0.57
4550515	C	ND	0.23
4550582	O	NC	0.43
4550582	O	ND	0.23
4550583	O	ND	0.72
4550590	O	NC	0.19
4550590	O	ND	0.25
4550592	O	NC	2.15
4550592	O	SC	2.31
4550593	O	NC	0.07
4550595	C	ND	0.24
4550595	O	EO	0.09
4550609	C	EC	0.31
4550609	O	NC	0.61
4550660	O	NC	1.08
4550660	O	ND	0.11
4550694	O	ND	0.64
4550999	C	ND	0.38
4550999	O	NC	0.25
4550999	O	ND	0.12
4557000	O	EO	5.73
4557158	C	EC	0.15
4557227	D	ED	1.16
4557228	D	ED	1.15
4557489	O	NC	1.48
4557490	C	ND	1.28
4557510	D	ED	0.37
4557938	C	EC	0.15
4557953	C	EC	0.01
4557953	C	ND	1.94
4557955	C	ND	0.79
4559000	C	ND	2.4
4559000	O	EO	0.77

-APPENDIX G--Appendix B -- SE GALENA EXISTING ROUTE STATUS
(ONLY ROADS WITHIN PROJECT BOUNDARY)
7/3/2002

ID	EX_CONDITION	FUTURE_CONDITION	LENGTH
4559000	O	ND	0.23
4559000	O	SC	1.29
4559214	C	EC	0.09
4559222	C	ND	0.07
4559282	D	ED	0.76
4559283	O	SC	3.81
4559284	O	SC	0.36
4559285	D	ED	0.12
4559306	O	NC	0.67
4559307	O	NC	0.19
4559308	O	NC	0.54
4559310	C	ND	0.19
4559408	D	ED	0.21
4559410	C	EC	0.1
4559412	C	ND	0.38
4559491	D	ED	0.23
4559643	O	SC	1.97
4559646	O	ND	0.75
4559677	O	NC	0.45
4559678	O	NC	0.43
4559779	O	ND	0.43
4559914	C	EC	0.69
4559937	D	ED	0.53
4559954	C	NC	2.72
4559956	O	SC	2.73
4559958	D	ED	1
4559972	D	ED	0.72
4559973	C	EC	0.38
4559975	C	ND	0.16
7000023	C	ND	0.41
7000024	C	EC	0.12
7000024	C	ND	0.55
7000061	C	ND	0.08
7000062	C	EC	0.3
7000099	C	EC	0.23
7000255	C	EC	2.4
7000475	C	EC	0.47
7000493	C	EC	0.35
7000660	D	ED	0.12
CO20000	O	EO	8.44
			======================
			325.08

Southeast Galena Roads Analysis
Existing Condition



Map 32

Legend

- SE Galena Analysis Boundry
- Malheur National Forest
- Existing Closed Road
- Existing Open Road
- Category I and II Streams

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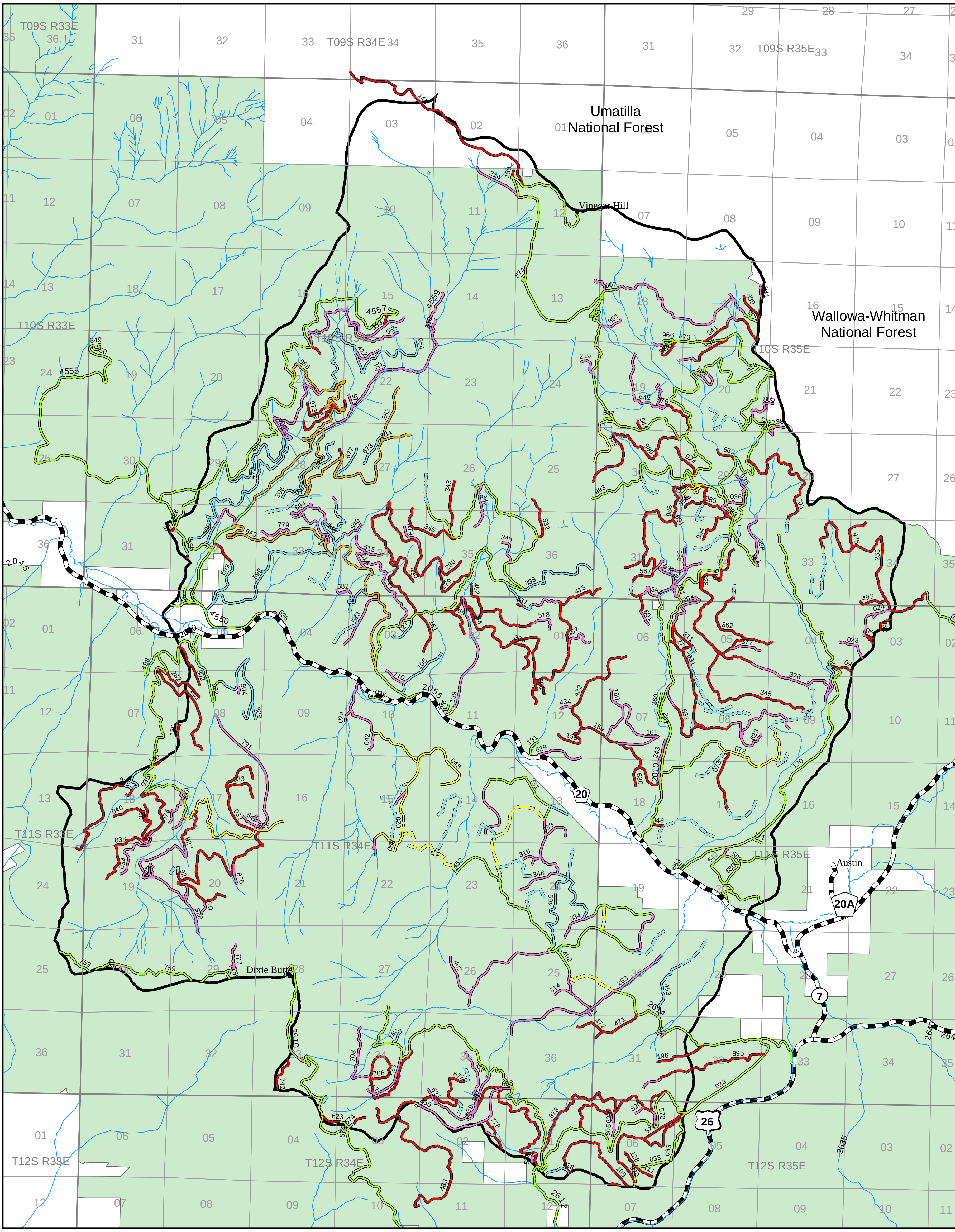
For more information contact the Malheur National Forest GIS department at (541)575-3000.

1 inch equals 1.189302 miles

0 0.375 0.75 1.5 2.25 3 Miles

Southeast Galena Roads Analysis
Recommended Changes to Existing System



Map 33

Legend

- Recommended Const.
- County Roads
- Existing Closure
- Existing Open
- New Closure
- New Decommission
- New Open
- Seasonal Closure
- Existing Roads
- Major Highways
- Category I and II Streams
- SE Galena Analysis Boundry
- Malheur National Forest

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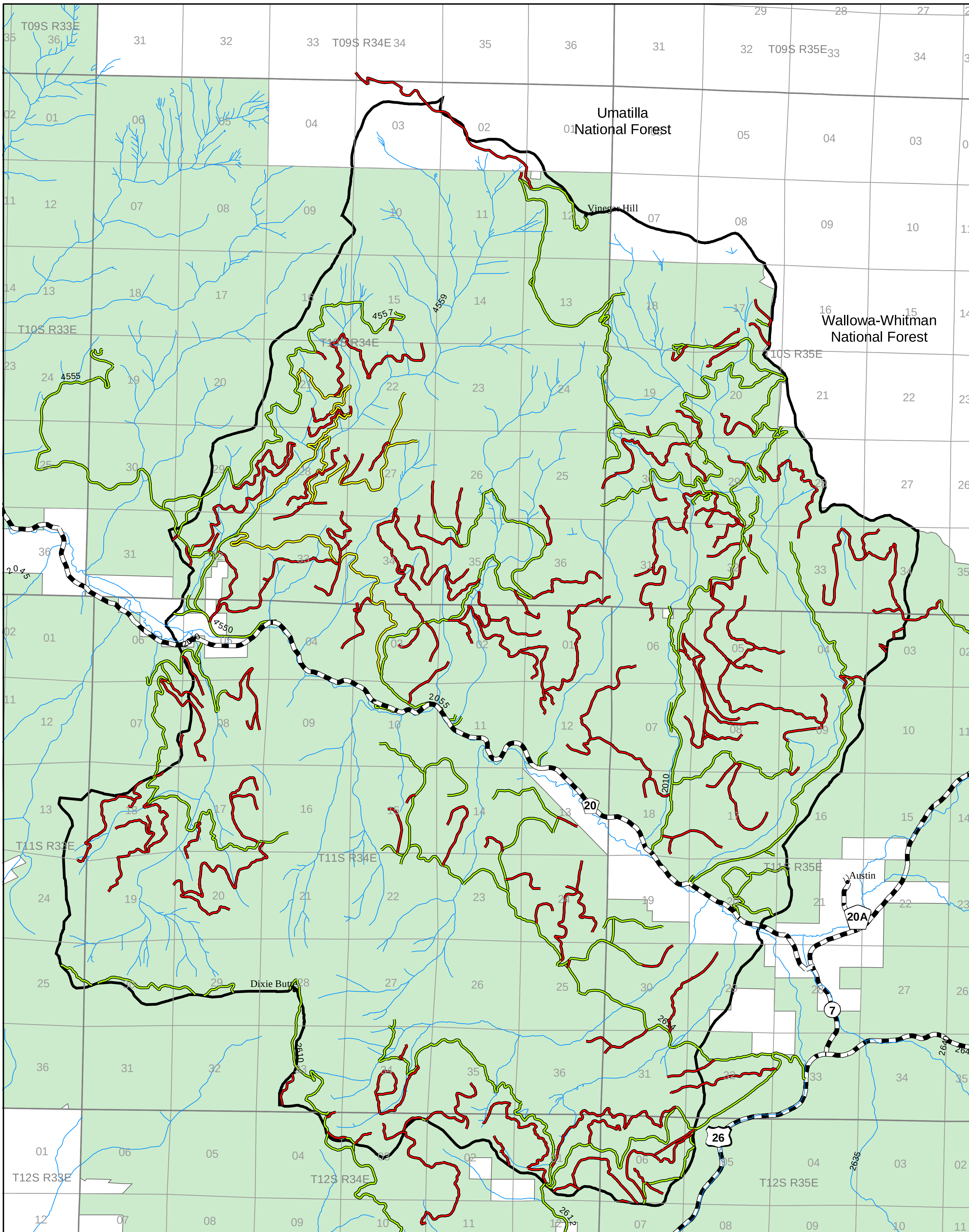
1 inch equals 1.189750 miles

0 0.375 0.75 1.5 2.25 3 Miles

Southeast Galena Roads Analysis
Recommended Future Road Management Objectives



Map 34

Legend

- Major Highways
- County Roads
- Future Closed
- Future Open
- Seasonal Closure
- Category I and II Streams
- SE Galena Analysis Boundry
- Malheur National Forest

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1 inch equals 1.189750 miles

0 0.375 0.75 1.5 2.25 3 Miles